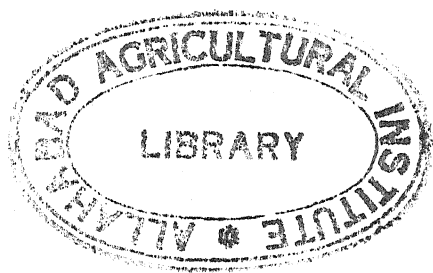


# TROPICAL AGRICULTURE AND ECONOMIC DEVELOPMENT

*by*

RUDOLF KOOL

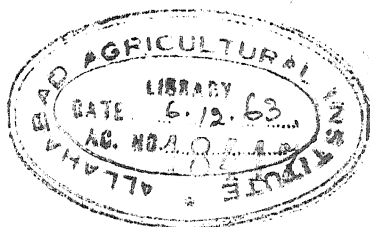
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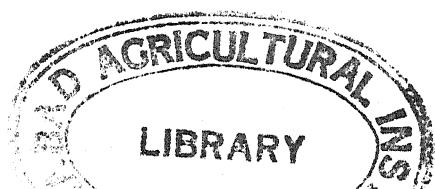
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TO

*Elisabeth, Simone and Johanna*



## PREFACE

Some time ago my wife suggested that I should write a book about the problems which concern both tropical agriculture and economic development. She made this suggestion after my own casual remark that, though there is an increasing amount of books dealing with the general economic problems of under-developed countries, little is said about the impact of agriculture in particular. I answered her of course that I would never do such a thing, that the job was too difficult and that anyhow in order to deal adequately with all the problems involved, a big handbook would be required. But I was flattered... and you all know that flattered men are weak ones.

The result of this weakness is a small book, nibbling at many interesting problems but never trying to reach at the bottom. It is written for students of agricultural colleges and for students in the economic and social sciences and last but certainly not least for the general reader.

I assume that some of the readers will be annoyed when they read certain chapters which are written in a vague, may be too general style. I apologize, dear reader, but I did it on purpose. Some subjects are too delicate to be illustrated with full particulars but they are also too important to be omitted.

I must thank the editors of two Dutch periodicals, 'Economisch-Statistische Berichten' and 'Co-op' for their kind permission to reprint large parts of articles, originally pub-



lished in their periodicals. They will come across them in the Chapters VIII and X.

I am greatly indebted to Mr. W. D. Reeve, a British economist, for all his suggestions, concerning the text.

But all the errors are my own.

Rabat, May 1960

## Chapter I

### THE PROBLEM OF THE ECONOMIC DEVELOPMENT OF TROPICAL AREAS

WESTERN EUROPE has become what may be called 'tropical-minded'. The twentieth century will certainly be known not only as the century of the child, or as the century of Freud, but also as the century of the under-developed country. The idea has widely gained ground in the various white nations that the coloured nations are living in straitened, almost poverty-stricken, circumstances, and that something should be done about it.

There are several reasons which may be adduced as to why Western public opinion should have taken this turn. To begin with, an active Marxism already existed at the turn of the century. In the conflict with capitalism, the so-called 'imperialism' of the West European countries as manifested in the second half of the 19th century, was also sharply criticized; the Marxist interpretation of capitalism was elaborated with critical observations on imperialism. In this connection the work of Rosa Luxembourg may be mentioned. Thus, the masses were presented with a picture, coloured or otherwise, of the life of the teeming millions of the tropics.<sup>1</sup>

The Second World War greatly accelerated the forming of public opinion concerning the poverty of the tropical countries. Colonial ties were severed one after another. As each new loss of an overseas possession occurs, so many arguments

<sup>1</sup> See W. Hancock, *Wealth of Colonies*, Cambridge 1953.

are put forward as to the implications of that loss, aired with all the modern methods of mass communication, that practically every inhabitant of the country concerned is forced to take a viewpoint. Furthermore, in taking a viewpoint a minimum knowledge of the factors concerned is required. That happened, for example when Britain relinquished India. It happened, when the Netherlands lost Indonesia.

We repeat that, generally speaking, Western Europe has become conscious that it has a task to fulfil with respect to the tropical world. It is at this point, that is, Western Europe's consciousness and concern with regard to the problems of tropical poverty that we reach the field of tropical development.

Primarily, a number of conflicting opinions exists as to the manner in which this development should be accomplished. A section of Western Europe still clings to the principle that peace and order must first reign in a tropical country, before aid, directed by Europeans, can be rendered. However, we leave this political sector with haste and embark upon the economic field.

That the stage of development of the tropical countries is definitely not roseate is evident by the following figures of national income in a number of such countries. These figures have been adjusted, as accurately as possible, to allow for price increases and growth in population. They show the rise or fall of the income per capita.

The figures in table 1 are approximations, but they indicate the social-economic drama being enacted in many tropical countries. Although certain advances in prosperity may be observed, the following facts must nevertheless be kept in mind:

TABLE 1. Index figures of income per capita <sup>1</sup>

Country	1939/40	1947/48	1956/57
Burma . . . . .	160	100	145
Chili . . . . .	80	95	140
Guatemala . . . . .	—	100	95
Honduras . . . . .	83	100	117
Indonesia . . . . .	116	—	106
India . . . . .	—	100	111
Mexico . . . . .	67	100	120
Southern Rhodesia . . . . .	78	88	120
Puerto Rico . . . . .	61	100	124

<sup>1</sup> *Statistics of National Income and Expenditure*, United Nations, New York 1957.

1. The standard of life at the point of departure — the years 1939–1940 — was exceedingly low. It was a starting-point of extreme national poverty. Thus a fifty per cent. rise in prosperity over a period of 15 or 20 years only means that at the end of that period a situation of somewhat mitigated poverty has been attained.
2. An increasing population pressure on national production may be expected during the first decades. Consequently, even in case of an increase of total wealth and income, it will be quite satisfactory if, for the next decades achievements per capita reach those of the period 1939–1958.
3. Compared with the more-developed countries the gap in economic growth will in all probability grow substantially larger. The average rise in prosperity was much greater in the more-developed countries. That trend is likely to continue in the future. The terms of trade during 1946–1958 were not unfavourable for the tropical countries supplying raw materials. But this situation might be modified gradually in favour of the industrial countries. There are also other symptoms.

4. There is one very important non-economic factor which will be a handicap even in case of a quick increase in income. That is, the people of the tropical zones are gradually becoming less contented with their living conditions. They want more out of life. They want more comfort, more amenities. This dissatisfaction has obviously economic consequences. The marginal rate of consumption – that part of a rise in income that will be spent on consumption – will become high and the marginal rate of saving will consequently decrease. And without saving there can be no investment. This dissatisfaction will grow.

All this has a profound effect on the economic perspectives of under-developed countries. Typical is the inadequate balance of the different, and often immature, production factors.<sup>1</sup> As such are mentioned: labour, capital, land and management. In general the aid now furnished by the United States and Western Europe will tend to strengthen all of them. It may already be clear that in numerous cases such aid may be of very little influence upon the very balancing of those production factors. In other words, it will be possible to exercise but little direct influence on the intricate interplay of human and material relations and of mutual understanding upon which full economic reality is founded. We shall first examine this more deeply.

When full knowledge is acquired of some of the important phenomena in the economic life of a tropical country many unpleasant surprises may come to those who obligingly furnish aid. First and foremost of these is the inconceivably

<sup>1</sup> See Stamp, *Our underdeveloped world*, London 1953.

rapid growth of the population.<sup>1</sup> In many peaceful and medically reorganized areas, the net annual population increase – births minus deaths – amounts to more than 25 per 1,000 inhabitants. The West Indies and many countries of Asia may be mentioned as examples. This means that the population is doubled within a few decades. As a rule, the professional population – between 15 and 60 years – will grow less rapidly, with the result that a substantially larger output per worker will be needed in future to maintain the existing minimum level of prosperity. This rapid growth means that plans and projects acquire a particularly dynamic aspect and, as a consequence, become difficult to execute.

The sensitivity of the monetary aspect may produce a second form of surprise. More often than not large-scale development projects are labour-intensive; the proportion of labour cost is very high. In the tropics wages are spent almost entirely on consumer goods. Insofar as this results in a dearth of domestically produced goods, there is a threat of price increases. Insofar as a demand for import goods arises, the equilibrium of the balance of payments is endangered. And an unfavourable balance of payments must be covered by credit granted by the more-developed countries, a state of affairs which is not attractive to young, nationalistically-minded countries.

The possibility of a price increase, as indicated above, has already become an accomplished fact in several tropical countries. The inflationary forces which arose during the Second World War were insufficiently checked after the war. The temporary shortage of goods was inadequately repressed by price control measures. Essential goods which

<sup>1</sup> See E. Russel, *World population and world food supplies*, London 1949, which evinces a moderate optimism.



had to be obtained from abroad became more and more expensive. In certain tropical countries sales of raw materials abroad engendered considerable monetary expansion inside the country. The monetary equilibrium, which may be described briefly as an equilibrium between the effective flow of goods and the effective supply of money, in a specified period, is unstable even in the more-developed countries. It is still more unstable in tropical areas.

Government expenditure, generally directed towards the maintenance and expansion of the civil service, can only accentuate this instability. Inflationary effects will probably accrue quickly in such countries. The opposite – this as a third form of surprise – may be expected of the indirect effects of government expenditure with respect to employment. In many tropical countries an extensive un- and under-employment, largely of a hidden nature, exists. If somewhat strict norms are set regarding the labour necessary for the national production, it is evident that the majority of the working population is unproductive during a part of the day. In the more-developed countries the concept ‘employment multiplier’ has already become a familiar term. If the authorities provide work for one hundred people and the income expenditure of these hundred people gives work to forty people, there is a multiplier effect of

$$\frac{100 + 40}{100} = 1.4.$$

In most of the tropical countries, however, it does not look as if a reasonable multiplier effect can be relied upon. Generally the industry, in the sector in which the new wage sum as a result of new government or private expenditure must be spent, is not working at full capacity so that no



extension of employment can be expected there. Moreover, a large part of the new wage sum may be spent on imported consumption goods and those imports do not create employment. In brief, one can say that forces giving unfavourable results – such as an inflationary price increase – are probable. There is little likelihood of multiplicative economic forces accruing favourably.

Yet in the brave attempts to work towards prosperity in tropical zones it is definitely the human factor that produces the greatest and the most complicated surprise. Far be it from us to claim that the coloured man of the tropics in his striving towards greater prosperity acts fundamentally differently to the white man. The white man often reacts illogically and unexpectedly. But it is not for nothing that important sections of the more-developed countries have walked the straight and narrow path of virtue, industry and thrift. This brought welfare to the white man. Tropical man, on the other hand, does illogical things which, however charming they may be, impoverish him and threaten to leave him poor both as an individual and as a group. There is, for instance, the cost of the celebration of some festival which may involve running himself into debt for months or even years on end. Doubtless an important motive for this is to escape the gnawing burden of a precarious existence. But his hard earned savings have disappeared into the hands of a Chinese or Indian shopkeeper.

Consumption in the sense of income expenditure is also a field of unexpected occurrences. With the aid of expert reports, the authorities may ascertain that people suffer from dietetic deficiencies, specifically from a lack of proteins and vitamins. The authorities can then do two things. They

can increase the domestic supplies of proteins, for instance by raising the production of oils and fats – coconut, soybean, oil palm, etc. – and of meat. They can also augment the real income of their citizens by means of a deliberate price control of the said oils and fats, and by raising the money income.

However, there is no certainty whatsoever that the population will then buy the oils and fats which would eliminate the dietetic deficiency. It is quite possible that one thing and another will lead instead to an increase in the consumption of non-essential commodities of general use, whether or not imported from abroad. Thus, many an agricultural and cattle-breeding project, however well-designed and well-intentioned it may be, may well be a complete failure.

As a worker, the 'economic man', in the tropics may behave just as inconsistent as his counterpart does in the temperate zone. It is sound practice for planning authorities in tropical countries – starting from a general development scheme – to draw up a number of regional plans. Inasmuch as the economy of tropical countries is predominantly rural planning concentrates on extensive agrarian development including forestry and cattle-farming. After the regional plans have been drawn up, applicants must be sought to undertake the various projects. It should cause no surprise that the number of applications for projects located in the vicinity of the towns greatly exceeds the numbers required. On the other hand, little interest is displayed in projects located in the remote hinterland, even when attractive guaranties and inducements are given by the government. Here we encounter one of the major difficulties of achieving the greater prosperity for tropical man, namely, urbanism. Many a non-white person will prefer a town-dweller's

existence, often existing on charity, to a more prosperous but monotonous rural life demanding strenuous physical exertion. The economic structure as such points to the necessity of rural development, but not infrequently tropical man himself blocks the road.

Finally there is one other aspect of human behaviour which must be included in our surprises, namely the behaviour of the young tropical man who has migrated to the town. Usually his great ambition will be to acquire wealth quickly with all the advantages attached thereto. He thinks he will find this wealth in trade, where a lot of money can seemingly be earned with some luck and no hard work. Unless the authorities impose comprehensive restrictions on urban residence the trade sector will thus probably become glutted with many small traders of, in an economic respect, dubious quality. Soon the number of urban unemployed will soar and as large industrial development is unlikely, they will become a burden on the Government.

In the foregoing discussion of the human factor it was tacitly assumed that, in any case, tropical man possessed a minimum of rational understanding and working experience. Not infrequently, however, even these are lacking. Quite staggering examples of this occurred in the development of Netherlands New Guinea. Experts with many years of tropical experience will initiate ideas for improving the extremely primitive agriculture. To this end a raw product, such as sago, will have to be delivered for processing to a central processing plant. However, deliveries will fall short because the planners had assumed that the workers to be recruited could, at least, carry the sagotrees. But they will prove unable to do so; they do not even know how to

carry a log of wood between two or three of them. And once they have been taught, the whole working-gang may disappear one fine morning because they feel tired of the grind of monotonous daily activities.

Then there is the capital factor – the total amount of capital goods such as machines in a country. Through a process of historical growth it has gradually become an established opinion in the more-developed countries that a strengthening of the capital factor is a primary condition for greater production and prosperity in tropical countries.

This is indubitably true, but we must not over-estimate its importance nor under-estimate the difficulty of enlarging the capital factor at short notice. It would take us too far to discuss the aforementioned historical process here. Let the following suffice.

In the past, private investments originating from more-developed countries have been very important for many tropical countries. The world wars and a growing nationalism have caused this stream of investment to disappear almost entirely. Between the lines of many a report of many a banking concern regarding the extent of capital investment in the tropics, a note of regret is heard that these investment openings no longer exist.

Much has been said and written about the shortage of capital in tropical countries. What is wanted, in fact, is to replenish the actual stock of capital goods by means of foreign loans. It should however be kept in mind that at the present time many tropical countries still lack the basic facilities which are absolutely necessary for the proper utilisation of the capital goods which are to be procured. For example, modern highways and adequate port facilities

are often lacking and sometimes there is an astonishing absence of any technical skill whatsoever among the population.

It is frankly doubtful whether a large credit grant alone will indeed lead to an accelerated development of the tropical country receiving aid. In any event, the wise thing to do in many cases will be to regard such credits partly as gifts. To be certain, the tropical country does need a lot of money, particularly for all kinds of projects which will yield next to nothing for years to come – perhaps for the next 20 to 30 years. There are indeed many requirements in the social sector of a development scheme.

The weakest aspect of a number of those development schemes is the fact that social and other not directly productive projects – transport – often outweigh the agrarian and industrial development projects. And even as to the latter – which should procure the badly needed increase in production – the question arises as to how much of the expected production can be sold domestically in a country with a low purchasing power, and how much can be exported. Then a new problem arises namely, whether the new production for export will be able to compete in the world market, that is to say whether that production will be able to meet the requirements as to standard quality, regular and phased supply and so on.

Evidently credit grants, although they may result in an increase in capital goods, do not automatically engender a rise in prosperity. Machines are costly and important factors; but they are only one of the conditions for successful industrial development. The primary requisite for successful industrial development is the certainty that the price realized per product will be greater than its cost price. And

prices are influenced by a number of factors of which the terms of credit are certainly not the most important.

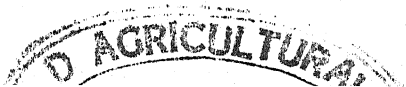
Let us continue with our critical observation of the expansion possibilities. Another production factor the land factor, in the sense of agricultural land, is of great importance to agrarian development. In various under-developed areas the amount of agricultural land per farmer is very small. Mention may be made of China, Java and parts of India. In this connection, however, too much attention should not be paid to the mere size of the holding. Of greater importance is the question whether the farmer really cultivates his land intensively and, if need be, will not shirk from clearing the tropical jungle to secure more land, and then again make intensive use of the new land. Upon close study it will be noted that the situation in Java is an exception. In truth, for many parts of the tropical world the cry of 'land hunger' is merely a political catchword. More often than not the tropical man of to-day is not in a position to till more than the three or four – seldom fully utilized – acres he owns.

Production factors must be harmoniously combined to obtain an optimum output. This is the task of management, and management and organization are therefore frequently described as the fourth production factor. This is probably the factor which takes the longest time to form. Leadership in economic life is not achieved in one single generation. That Western Europe nowadays has at its disposal so many competent leaders in private industry and so many capable officials is due to the cultural, economic and social development which that part of the world has undergone since the Middle Ages. The broad stratum of the middle classes and minor officials forms an excellent breeding ground for

leaders. Yet even in Europe there are shortages of leaders. How then can it be expected that in the tropical countries adequate managerial skills can be developed within a short space of time?

So far we have reviewed a number of aspects of economic life in the tropics. We have seen that the existing situation is unsatisfactory and that even with the aid of rich countries the future prospects in many countries are not always favourable. It is most gratifying that the duty of the more-developed countries to extend aid is now realized by many. Such aid may be regarded as economic co-operation between the more- and the less-developed countries. In principle, this co-operation may assume four forms, i.e. the exchange of goods, the granting of credits, the provision of labour and the provision of technical assistance.

The exchange of goods brings us to the business of import and export. In general, a tropical country exports goods that are very susceptible to fluctuating market conditions, mainly agricultural products and industrial raw materials. To be able to import more capital and consumer goods there must be an increase in exports. It is, however, no easy matter to promote the export of agricultural products such as rice, coffee, etc., because generally such commodities do not constitute an essential part of the demand for consumer goods of the more-developed countries. Moreover, for simple technical reasons – for many products the time from planting to harvesting is at least a year – the supply reacts very slowly to a fall in prices. Furthermore, where such goods are traded on the New York and West European markets, typically commercial elements are ever present – markets in futures and the speculation – which create



wide price fluctuations weekly or daily. The sale of industrial raw materials gives less cause for concern since the mining, processing and marketing of these materials is nearly always in hands of a foreign concern. But the authorities of the tropical country concerned are thus unable to exert much influence to increase exports.

We referred above to credits which are granted to reduce the deficit on the balance of payments, thereby opening up possibilities for a larger import trade. It should never be forgotten, however, that the sober and often ruthless judgment of the private businessman on the feasibility of extending credits to tropical countries is often the only right one. No private individual can be expected to extend credit which compares unfavorably, both as regards yield and risk, with a corresponding investment in a Western industrial country. That is why there are so many public loans and so few private ones granted to tropical countries after the Second World War.

It is interesting, in this connection, to mention the criteria set by the International Bank for Reconstruction and Development with respect to loans to tropical countries. In the first place credit applications submitted to this bank must be based on a detailed description of the proposed project, supplemented by full and reliable figures as to the cost and returns involved. A second stipulation is that there must be a substantial financial participation by the tropical country itself. Also the credit to be extended may generally only be used for the purchase of capital goods from outside the tropical country concerned.

According to many authorities current credit grants, including public loans, are still inadequate. The latest insti-



tution founded for the purpose of granting credits is SUNFED (Special United Nations Fund for Economic Development).

To this day, however, the private investor remains reluctant to put his money into tropical countries. And this reluctance is an indication that the fundamental economic problem of tropical development has not yet been solved. That fundamental problem is to regulate the production cost of the industries and of agriculture in order to make their products permanently competitive on foreign markets and at the same time to give a rapidly expanding population a minimum subsistence. Whereas production cost are only slightly influenced by the terms of a foreign loan, they are decisively influenced by the local level of labour productivity. In turn, numerous economic and non-economic elements exercise their influence on this productivity. High production cost make it unlikely that essential export targets can be achieved.

We can be brief about the third form of economic co-operation, the migration of workers. It is known from experience that labourers from more-developed countries never go to work in tropical countries in large numbers. It should not be forgotten that such migration would be strongly opposed in the tropical countries themselves.

Finally, there is the fourth form of international aid to tropical development – the provision of technical assistance. There is a gratifying increase in the number of European and American experts now bringing knowledge to tropical areas. There is a gratifying increase in the number of scholarships made available to the inhabitants of tropical countries. Yet it must be acknowledged that at the most this aid is a mere drop, be it a fairly large one, in the bucket.

So far we have seen something of the great difficulties and unsuspected surprises which may be encountered in the field of tropical development. We have seen that aid can be rendered in many different forms, that the aid now extended is inadequate, and that such aid as is given does not always produce the useful effects the giver expects it to have.

In the following chapters we shall examine some of the economic aspects of tropical agriculture. In the struggle for greater prosperity in tropical countries agriculture plays a predominant role. The success of every agricultural project is determined to a considerable extent by the economic potentialities. In Chapter II we propose to discuss the economic consequences of natural conditions.

## Chapter II

### ECONOMIC CONSEQUENCES OF NATURAL CONDITIONS

A number of economic consequences for the practice of agriculture proceed from a tropical country's natural conditions. In this chapter we shall examine only those consequences which influence in an upward direction the cost price of various agricultural products. For this purpose, natural conditions may be classified as: the distance from the place of production to markets; the size of the country; the presence of mountains; and the climate and the nature of the soil.

The geographical position of a tropical area may have considerable economic consequences. The opening of the Suez Canal in 1869, for instance, had an unfavourable effect on the marketing possibilities of West Indian agricultural products because of the new competition from South East Asia. This is shown in the following table:

TABLE 2. Distance between Europe and South East Asia (in sea miles)

Route	Via Cape of Good Hope	Via Suez Canal	% Diminution of distance
London-Calcutta . . . . .	12,143	8,292	31.5
London-Singapore . . . . .	12,004	8,019	33.0
Amsterdam-Djakarta . . . . .	12,000	8,500	31.0

If the opening of the Suez Canal brought about adverse consequences for the West Indies and particularly for the

Guianas, the situation was further aggravated by the opening of the Panama Canal. It must also be noted that the distance to New York and London from the Guianas was already greater than from the British West Indian islands in the Caribbean. The Guianas thus became isolated. They were bypassed by the large shipping routes and freight tariffs, so important for tropical export products, rose to an almost prohibitive height. South East Asia's power to compete increased substantially as a result of the opening of the Suez Canal. Here, the actual geographical position had favourable effects.

This is not the case, however, if the surface of a country is substantially mountainous. The mountainous country of Puerto Rico and Java, for instance, greatly reduces the amount of available agricultural land. The presence of mountain ranges may unfavourably influence production in different ways. Among these may be mentioned the difficulties encountered in constructing rail and motor roads necessary for the transportation of goods, a matter of major importance to an under-developed country. The situation existing in Columbia may serve to illustrate this point.

The presence of high mountains may have yet another unfavourable effect. This is so as regards the range of mountains in Asia intersecting the Middle East in an east-westerly direction. At the northern end wind and rain contribute to the fertility of the arable land, whereas the region situated south of this range is characterized by extreme drought. This aridity has made poverty a permanent feature of indigenous agriculture – a poverty which is not compensated by the exploitation of oil fields. The mountain ridges of Columbia cut the country into four sections which are independent of each other from the economic-geographical viewpoint. On

the other hand, the island of Java largely owes its fertile soil to the proximity of volcanoes.

Climate and soil are of paramount importance to the economic outcome of tropical agriculture. By a tropical climate is meant a climate of a relatively high temperature and a relatively intense rainfall. According to Gourou, a region may be said to have a tropical climate where, throughout the whole year, the average temperature never drops below  $18^{\circ}$  cent. ( $65^{\circ}$  Fahrenheit), and where there is sufficient rainfall to make agriculture practicable without irrigation. That would probably require a minimum rainfall of 500 mm. (20 inches) a year. Usually in the tropics there is a substantially higher rainfall than this figure. In Indonesia, for example, an average annual rainfall of less than 1,000 mm. (39 inches) is most exceptional. Naturally the spread of this rainfall throughout the year is of importance. A prolonged drought may have unfavourable economic consequences, whereas an overabundant rainfall during a short period may be disastrous.

Next, we want to draw attention to a number of factors which increase the cost of tropical agriculture, caused by the prevalence of warm and moist air. Under such conditions production is persistently threatened by plant diseases and by noxious insects. Losses and damage may occur either during planting or after harvesting. The growth of rank weeds and the temporary droughts caused by irregular rainfall are also detrimental. The bad economic effects of plant diseases are revealed in studies of the economic history of practically every tropical country. On the Gold Coast in the vicinity of Accra, for instance, there are very important cocoa plantations. Diseases of the cocoa



plants have reduced crops some years ago to such an extent that cocoa supplies on the world market were considerably restricted. The exhaustion of the soil, combined with plant diseases, has reduced the production of Brazilian coffee. The Panama disease has severely damaged banana plantations in the West Indies. The cultivation of coffee in Indonesia suffered similarly in the years following 1890.

In the past, the agriculture of Surinam was ravaged by various diseases. Among these may be mentioned mycosis which affects the cocoa plant and the Panama disease which attacks the banana plant. The outbreak of mycosis at the beginning of the 20th century must be considered one of the principal causes of the present poverty of Surinam agriculture. Following the country's emancipation in 1863, the negroes applied themselves to cocoa growing. Exports which amounted to approximately 6,000 bales around 1870, mounted rapidly, increasing to more than 22,000 bales in 1890 and reaching a peak of 45,000 bales of 100 kg. (220 lbs. each) in 1893. Mycosis made its appearance in a Surinam district in 1895, soon spreading rapidly throughout the whole country. Subsequent investigations showed that the disease must have been prevalent in Surinam long before the actual outbreak. The disease was caused by a mildew which attacked both branches and fruit, thereby destroying them. By 1904, cocoa production had dropped to 20 per cent. of the 1895 production. When the mildew made its appearance once more a few decades later, and the plantings suffered from a severe drought in 1925, the culture of cocoa disappeared altogether.

As a result of this setback, the cultivation of bananas was encouraged by the authorities. With very substantial government support, several thousands of acres were planted with

bananas. The first shipment to America took place in the spring of 1908, and by 1909 the whole contracted area was ready. In the meantime, great destruction was being caused by the Panama disease. Only a few years after the plans had been put into operation, more than 5,000 of the 7,500 acres had been ravaged by this disease. In fact it was found to be severely damaging to banana cultivation throughout the whole of the West Indies. In making up the accounts in Surinam, the various banana growing plantations were shown to have incurred a debt of 2 million Dutch guilders.

The necessity for scientific research on tropical agriculture was recognized several decades ago. But it was found that this work could only be carried out if the financial-economic interests of foreign enterprises were substantial enough. Research was therefore often directed only to products which were already established and this gave the work a certain static character.

As an exception to this, however, the activities carried out by various research institutions in Indonesia prior to 1940 deserve mentioning. Research outside the estate interests was very extensive and concentrated on furthering the interests of domestic agriculture and on discovering new crops and new possibilities. We refer, for example, to the extensive research work which was carried out in connection with the cultivation of rice varieties.

On the other hand, the Imperial College of Tropical Agriculture in Trinidad, one of the principal research centres of the West Indies, devoted itself until recently almost exclusively to the requirements of the sugar and cocoa enterprises.

As indicated earlier, insect infestation may also occur

during the storage and transport of agricultural products, in which case it may reduce production by as much as 10 to 15 per cent. Naturally there is then an opportunity for the government of the country concerned to make an important contribution to the national production by improving storage space and transport facilities. It is assumed, of course, that such storage places will not be utilized by the farmers as a living room, a surprise which sometimes occurs.

A special problem may be created by the presence of ants. Occasionally the acreage set aside for domestic farming is larger than actually used, and the farmers' unoccupied land is neglected. These unkept fields form an ideal assembly place for millions of ants, the most notorious being the parasol ants of the West Indies and the Guianas. To the small farmer their extermination is a costly affair.

Chemicals are now used to destroy the rampant growth of weeds, so typical of tropical lands. Provided the right method is used, a reasonable success is certain. This chemical control is not the only method that has met with success. For instance in the case of wet rice cultivation where water levels can be adjusted, the rice fields are frequently flooded immediately after sowing has taken place. Weeds are thus prevented from gaining a fatal grip on the young rice stalks. The classical control method of weeding by hand is still popular in a good many tropical countries where labour is still relatively cheap.

It goes without saying that the intensity of the rainfall exerts a predominant influence upon the agriculture of tropical areas. It was noted earlier that there are tropical countries which have a history of great periodic droughts. But unpredictable surprises occur repeatedly with respect to the



duration of the rainy and dry periods. In 1954, for instance, the world food situation was affected by the unprecedented rainfall suffered in the autumn of that year in countries such as China, Burma, Tibet, Nepal, India and Pakistan. By contrast, the north-western parts of India and Pakistan experienced an exceptional drought. Owing to a lack of water, a large area under cultivation could no longer be irrigated. This difficult situation was aggravated by a serious dispute between India and Pakistan regarding the allocation of water between their irrigation systems. A mission of the International Bank of Reconstruction and Development strove to reach a settlement in the dispute.

Rainfall in tropical countries has various economic effects. During certain months of the year there is so much rain in the mornings that workers are unable to carry out their normal activities. This is of minor importance where domestic farming is concerned, but in estate agriculture there may be a considerable loss of time through wet weather. Nowadays, contractors in many countries pay out wages in full or in part to their workmen who are laid off because of rain. However, this is not offset by production. It may happen that out of a total of 26 workdays a month, 10 are written off as lost because of rain. The loss in this case not only involves the work on the plantation, but also the maintenance of roads and bridges, house-building and, especially, reclamation projects.

Land reclamation should be considered an important phase in the development of a tropical country. The rural development of an uncultivated area does indeed comprise many other activities, but the time required for their execution is largely dependent on the tempo in which the land is reclaimed. In other words, any stagnation in the work of



reclamation automatically disturbs the progress of the development scheme. Many of these schemes consist of settlement projects drawn up and initially tackled on a large scale. While gangs of workmen have scarcely begun to clear the land, roads are laid, houses and bridges are built and sometimes even processing plants for the expected agricultural products are installed. The latest joke in this field is the installation of a canning-factory – somewhere in the Middle East – years before the first fruits will be available. The rain factor therefore constitutes a disturbing element in many development schemes. Various attempts to make a prognoses of forthcoming rainfall have thus far always met with failure.

Another climatic factor of importance to agricultural production is wind. In general, the prevalence of wind may be regarded as unfavourable. The lower the force of the wind, the less danger of damage to tree cultures. In the so-called hurricane belts, one of the most notorious of which encompasses the Caribbean and Central America, winds may have catastrophic consequences. British Guiana and Surinam fall outside this belt, but Columbia experiences its detrimental effects. The damage is not confined to tree cultures alone. There may be widespread damage to sugar and rice plantations, and sugar happens to be the economic cork on which the Caribbean area floats. The frequent combination of rain and wind also has a detrimental effect on production. It may flatten the rice stalks, which, in turn, complicates mechanical harvesting. Obviously wind also plays a part in the destructive process of soil erosion.

Another important element in the cost price is the nature of the soil. Here, however, although he cannot influence

climate, man can more or less intervene. The fact that human intervention was nonexistent or at any rate very defective in the past has had great influence upon the present situation in tropical agriculture. There is no need to go as far as some writers who regard the neglect of the soil as the underlying determinant of the course of world history and the extinction of different civilizations. Yet Gourou's observation that the downfall of the Aztecs in Central America was partly a result of the neglect of the soil, contains probably considerable truth.<sup>1</sup> In any case a great deal of significance should be attached to soil erosion as a result of neglect. In the first place there are a few observations to be made regarding the nature of the soil in general.

A relatively high temperature combined with high humidity and an intense rainfall accelerates the chemical processes working in every soil to a greater extent than does a temperate climate. The various minerals derived from weathering processes and functioning as nutritious substances to vegetation are eliminated more rapidly. Land loses its chemical fertility rather quickly in the tropics. A distinction is therefore made in many tropical countries between so-called old and youthful land, the latter retaining a bigger quantity of unweathered minerals. Land with a comparatively high productive capacity is to be found specifically in regions which displayed volcanic activity in recent geological periods and in the vicinity of geologically youthful river deposits and youthful sea deposits. Java in one of the places where this type of land is encountered. Consequently it follows that many of the tropical areas are hardly suitable or not suitable at all for agricultural production.

<sup>1</sup> See Gourou, *Les Pays Tropicaux*, Paris 1953, page 50.

Nevertheless, the legend of the fertility of tropical lands doggedly persists. That is how it came about that a contractor, looking for suitable farm land in New Guinea, believed he had found it in a region of a relatively meagre vegetation. Sowing could be done here without too much difficulty. But after a time it was discovered that the crops simply would not come up. In the initial stages of the British Government's groundnut scheme in Tanganyika, a site was selected in a region of sparse vegetation where the land could be cleared quickly and easily. But the clearing was the only thing that turned out to be smooth and easy, the harvest proved a great disappointment.

These experiences demonstrate that in clearing virgin land allowance should always be made for the fact that a sparse overgrowth often goes together with land of a poor quality. In order to secure good land for cultivation, heavy trees must first be removed. Fundamental problems are involved in this removal. The stratum which is of consequence to agriculture is only a few feet deep. The fertility of this relatively thin layer has been drastically reduced in many development areas because the land was cleared with heavy equipment such as bulldozers, in a similar manner to that used by the United States armies in building their airfields during the war. The reclamation of tropical land requires experienced operators and reliable equipment, both of which are expensive.

The symptoms of erosion, silting, drying up, etc. do not, in fact, fall within the range of consequences of natural conditions. Here, it is a question of negligence by man who, prompted by different motives, neglects the soil at his disposal. Nevertheless, the elements of nature are also a

factor in the neglect of the soil. For example, there is generally a much greater likelihood of erosion on sloping lands. Land will dry up more quickly in a tropical region which has no proper irrigation possibilities. The same thing applies to the silting of the land. Furthermore, one sector of economic life may contribute to production difficulties in another sector: for example, the unsystematic tree-felling which went on in the elevated regions of Java in the past, resulted in farmers in the lower regions seeing their production decline sharply because of erosion.

The destruction of soil fertility is the heart of the agricultural question. The rate of speed of the destructive process depends, in part, on the intensity of the rainfall, the slope of the land and the infiltration capacity of the soil. For instance, soils of clay and sand are less susceptible to erosion than loams. That a shower of rain can have a considerable effect is evident from American experiments which showed that a tropical shower can generate enough kinetic energy to raise by 100 cm. (40 inches) a ground layer 15 cm. (6 inches) thick.

However, most of the erosion occurring during recent decades has not been due to natural conditions but to man's neglect. This applies especially to the unsystematic deforestation of relatively elevated regions. The deforestation of the borders of the desert – combined with sand drifting – causes the Sahara annually to extend a mile to the South. The forests of the Congo formerly extended to Khartoum. The famines in India can probably be largely ascribed to the injudicious use of the soil.<sup>1</sup>

The drying and silting of agricultural land is also encoun-

<sup>1</sup> Data derived from notes for private circulation only by Dr. J. H. de Haan, Wageningen.

tered in tropical countries. A striking example of this is the neglected plantation land of the Guianas. In Surinam, the old plantations were areas of good soil which were irrigated and had natural drainage into the rivers. As a result of the country's economic recession, these areas, which probably extended to 250,000 acres, were abandoned during the 18th and 19th centuries. From then on the system of sluices was neglected; most of the sluices were sold for scrap and the masonry was pulled down. A penetration of sea water followed and began a silting process whereby the once fertile areas deteriorated into economically inferior lands.

Surveying the list of natural conditions which influence production, it is clear that, taken together, the majority of them may have extremely unfavourable consequences. This is shown in certain agricultural regions of Columbia, where now less than 10 per cent. of the total land area is suitable for agriculture. In certain densely populated districts, such as Santander, the amount of land available is very small. Production is predominantly carried out on small holdings with the result that cultivation methods are inefficient. The need for land has forced a number of families to cultivate the mountain areas, notwithstanding the fact that they often have a slope of  $45^{\circ}$ . The comparatively intensive methods of cultivation have led to an injudicious use of the soil, and this, in turn, has caused erosion. The mountains divide the agricultural area into small-sized units practically isolated from one another.

The geologically youthful lands of the coastal plain in the Guianas are adversely affected by natural conditions. The combined action of wind and rain for example flattens the

rice, one of the principal products of native agriculture. A much greater disadvantage to Surinam, however, is the fact that the natural drainage of the coastal plain, so important to rice cultivation, is inadequate. Even when artificial drainage is attempted, discharge into the sea is found to be impossible for technical reasons. Drainage into the rivers, too, is often defective; hence large areas situated at some distance from the river cannot be properly drained. As a consequence, the economic value of the land is considerably lowered. The ultimate solution would be to install an expensive 'polder' system, pumping the water out and into the 'polder'.

Finally, New Guinea may be mentioned as a territory where there are great difficulties in accelerating development. Its economic-geographical location with respect to the more-developed territories is exceedingly unfavourable. New Guinea is very far from the markets of Western Europe and America, the chief customers for agrarian products. A large part of the land consists of high mountain ranges. Moreover, the soil of the island is almost completely overgrown with a very dense vegetation. Experience has taught that the fertility of the soil is probably low. Such observations as have been possible indicate that in the interior and in the mountainous areas of the territory there is an average annual rainfall of from 3,000 to 6,000 mm. (118 to 236 inches). Coupled with the prevailing tropical temperatures, this intense rainfall encourages the growth of weeds. It is also favourable to the propagation of insect pests and plant diseases. The greater part of the island is uninhabited, in itself an indication of how unfavourable the chances are for agriculture.

### *Chapter III*

#### LABOUR OUTPUT OF THE TROPICAL FARMER

**I**t is well-known that the temperate zones are conducive to high human energy. But is this an adequate explanation for their economic development? There are tropical and subtropical countries which are less developed to-day, but which knew great prosperity in the past. One reason for this may be the adverse effects of erosion. One cannot accept without any reservation that as temperature and humidity increase when journeying from the temperate to the tropical zone, the natural energy of the inhabitants automatically diminishes. It is sufficient to note that tropical man often has less natural energy than the denizen of the temperate zone. And whatever may be the reason, a relatively greater prosperity prevails in this temperate zone.

Apart from its possible effects on human energy, climate causes a discontinuity in the labour process. For example we may mention the impossibility in the tropics of working during certain hours of the day or certain months of the year, because of rainfall and other reasons. Other circumstances may also affect agricultural production: for instance, in areas of poor soil, insects, weeds and drought, very small outputs are obtained in spite of relatively strenuous exertions. This may well arouse a certain disinclination to work.

There are, however, several other factors which anyhow influence human energy and the resulting output of labour.



These include diet, health, housing conditions and recreational activities.

First of all there is the tropical diet, to which so many publications have been devoted by various organizations since the end of the Second World War. In general, the diet of tropical man is characterized by consumption of a single type of food which, expressed in money value, is cheap. But here again there are no generally accepted standards. In 1946 already, the Food and Agricultural Organization of the United Nations suggested for the temperate zone a general subsistence minimum of 1,800 calories plus 30 to 65 grammes of proteins per man per day, according to age and occupation. It was believed that these requirements could be reduced to 1,600 calories plus 25 to 60 grammes of proteins a day for the inhabitants of tropical countries. The quality of the available proteins has large influence on the quantity required. Place of residence and physique considerably influence man's daily needs. Those needs are roughly proportionate to the average body weight. The average Javanese weighs approximately 52 kg. (115 lbs) and the average European 70 kg. (154 lbs). In other words, a diet that would be regarded as wholly inadequate in Europe may be considered as fairly reasonable in the tropics.

Compared with conditions existing prior to 1940, the post-war world food situation has shown improvement only in those countries where the increase of population has not been excessive. Thus, the dietetic situation improved in the American and, to a lesser extent, in the African continent; whereas in the period from 1940 to 1950, a large part of the Asian population lived on or below the physical subsistence minimum. Since 1950, however, there has been a gradual if slight improvement.

While no exact data are available with respect to the influence of temperature and humidity on the energy of the worker, the unfavourable effect of an inadequate diet on labour output must be accepted as an incontestable fact. An insufficient diet causes muscular fatigue which may persist for a long time before utter exhaustion sets in.

Family budget analyses made in the tropics indicate that rice and other starch products play a dominant role in the native diet. Both as regards quantity and quality supplementary nourishment is meagre. As compared with the diet in the temperate zone the tropical diet has – as was indicated above – a low percentage of animal proteins and fats while few vegetables and fruits of high nutritional value are eaten. The menu is also often closely adapted to the type of local agricultural production. For instance, a relatively high consumption of fish occurs in regions bordering the sea; coconut oil is a correspondingly large item on the menu in regions abounding in coconut palms.

It is evident from the foregoing that tropical man's diet is not favourable to his health. Some of the endemic diseases are therefore ascribed to insufficient and injudicious nutrition, while the power of resistance to other diseases is greatly reduced by dietetic deficiencies. In addition endemic in the tropics are diseases such as hookworm, intestinal infections, malaria, skin diseases and infectious fevers. The hot and generally humid climate of the tropics affords an excellent breeding ground for all kinds of parasites. Moreover, poor housing and the impossibility of practising normal hygiene increase the chances of contracting diseases. The loss of labour incurred as a result of these diseases is considerable.

One can, therefore, heartily agree with Gourou's observa-

tion that: 'L'humanité tropicale est limitée dans son activité physique, dans son activité psychique, dans sa multiplication par des maladies graves qui existent seulement par la faveur du climat chaud et humide'.<sup>1</sup> (Tropical humanity is limited in its physical activity, in its psychical activity, in its multiplication by serious diseases which exist only in a hot and humid climate). According to Gourou not only humans but animals also experience the unfavourable influences of the tropical climate. Herein lurks one of the technical difficulties of cattle breeding.

Housing conditions and recreational activities were also mentioned among the determinants of tropical man's ability and willingness to work. Just a few words on these two determinants will suffice. The average housing accomodation of tropical man is so inferior that, in fact, neither the term housing nor the term living accomodation should properly be applied. The local availabilities determine the type of building material. Wood especially is used, the roofing sometimes being of flimsy construction.

In many tropical countries the need for better and bigger housing is staggering. For instance, in the Caribbean area with a total population of 6 to 7 million, housing for 3 million inhabitants is said to be lacking. In view of the economic backwardness of this area, arrears in this field cannot be made up in the near future. Add to this the unsatisfactory manner in which tropical man spends his leisure, it is obvious that his environment is far from conducive to physical and mental development.

Finally mention must be made of the educational facilities that are provided. The lack of education and the resultant

<sup>1</sup> See Gourou, *Les Pays Tropicaux*, page 84.



illiteracy is considerable in comparison with the more-developed countries. Not only are the facilities for elementary general education lacking – both as to standards and as to the number of schools – but facilities for training workers in industry and agriculture are often nonexistent.

Many attractive rural projects are included in the development plans of various tropical countries, but the outlook becomes rather less roseate when the standards of technical instruction and the availability of skilled farmers are taken into consideration. Agriculture in Western Europe and North America is founded on a basis which, in addition to management and technical equipment, also possesses a broad basis of skilled farmers. But it took many decades to form this basis.

In general, the development of technical training for both sexes is of major importance to labour productivity and prosperity.<sup>1</sup> As the population grows there is an increasing number not only of male but also of female workers. Vocational education will therefore very definitely have to include household instruction. One cannot escape the impression, when studying various development plans, that because of financial stringency, only secondary importance has hitherto been attached to the problem of female workers. The increase in population is roughly the same for both sexes. It is of considerable economic importance that future farmers' wives and prospective housewives be trained to become sound consumers with the ability to spend their income wisely. A flaw in economic planning will thus be remedied and corrected.

<sup>1</sup> See Cumper, 'Two studies in Jamaican Productivity' in *Social and Economic Studies*, June 1953.

As previously indicated, a man's willingness to work is conditioned by his environment. Tropical man was sketched in his actual living conditions. His existence proved to be characterized by disease, insufficient nutrition and inferior housing.

Experience has shown that material conditions such as health, nutrition and housing must be improved if the tropical worker is to be induced to perform the same amount of work as the white worker under identical conditions. Immaterial conditions – research in the fields of rural psychology and rural sociology – must also be taken into consideration. To anyone who has studied West European conditions this will not come as a surprise. For, to the European also, the pursuit of gain in the form of an optimum money income is merely one element in the totality of human motives. Sociological research has convincingly demonstrated that the behaviour of the West European is also strongly influenced by his urge for self-assertion in his own group. This is equally true of the economic activity of the tropical man.<sup>1</sup>

Whether he be employer or employee, worker or consumer, tropical man cannot be conceived as an individual dominated only by the idea of financial gain. His behaviour is largely determined by motives other than monetary gain; immaterial values, particularly values of a social character, carry much weight.

It is held that tropical man is psychologically less stable and more emotional. Merely because of this, a sociological approach to the problem of the productivity of labour may

<sup>1</sup> See S. Rottenberg, 'Income and leisure in an underdeveloped economy' in *The Journal of Political Economy*, April 1952.

yield results that compare favourably with those in the temperate zone. Two frequent sociological imperfections of tropical society must be mentioned. The first is the absence of a middle class and the other the lack of social unity. In all probability, material and spiritual poverty tends to inhibit social activity. This is shown, for instance, in the frequent failures of agricultural co-operative societies.

The problem in the tropics of marginal man – e.i. the man who lives between two civilizations, the old one and the new one – whose behaviour as an economic subject may differ widely from that of the white worker, is an important feature in each study on labor productivity. The important relationship between mental make-up and racial characteristics cannot be discussed here, but it should never be forgotten that psychological and sociological factors play a major role in determining the productivity of labour.

Thus it is that the matriarchal family structure common among the Creole communities inhabiting the West Indies probably exerts a restraining influence on the willingness of the male worker to perform continuous and monotonous labour. In general he does not shoulder the social obligations of family care and paternity which make the European worker permanently ready to work. Similarly the labour output of Javanese workers in estate agriculture depends upon whether or not they are able to live in a *desa*; at the same time the maintenance of traditional feasts and customs has also proved to have a beneficial effect. And thus many a young Hindu couple will leave their 'Hindu undivided family' enterprise in order to escape from the 'tyranny' of the bridegroom's father.

A correct approach to the presumably higher emotionality of the tropical worker may lead to remarkable success. The

writer knows from personal experience that a coloured worker is often better than his white colleague at performing certain more simple tasks, especially in the technical field. Nevertheless, one must be realistic. All planning for economic development should take into account the probability that the output of labour, compared with European standards, will be disappointing.

The principal economic cause for this low labour productivity is, in fact, the low labour productivity itself. Production is not large enough to start the cumulative process of rising production and prosperity that is so characteristic of the more-developed countries. This lack of generating power is ultimately attributable to the imperfection of the labour factor itself, arising from the relationship between this factor and the other production factors. As a result, the behaviour of tropical man is determined by his insecure existence – an existence of constant monetary stringency.

The tropical man who emerges from this rough inventory is a man whose behaviour with respect to economic activity differs in many ways from the behaviour of a European in similar circumstances. It is practically certain that environmental factors play a very large role and racial factors a small one. To what extent one should regard heightened emotionality as falling in the latter classification is irrelevant here. Tropical man's whole outlook and behaviour are coloured by his poverty and insecurity.

## *Chapter IV*

### ECONOMIC WEAKNESS OF TROPICAL DOMESTIC AGRICULTURE

**I**n many tropical territories agriculture is still largely aimed at the satisfaction of wants. It may be said that, by and large, domestic agriculture contributes more to a country's total production than does estate agriculture. Such a statement, of course, disregards the problem of labour productivity and considers merely the total contribution. Thus the so-called 'closed' economy practised in New Guinea, – characterized by absence of money and of relations with the outside world – is certainly a form of economic activity. For, after all, all economic activity is attuned to consumption, and wherever there is consumption there is, of necessity, economic activity.

In agriculture, both temperate and tropical, selection of crops is based on human wants and agrarian possibilities. Yet even without human intervention, nature, and particularly tropical nature, produces considerable quantities of edible carbo-hydrates. Even under the most unfavourable conditions tropical man can always subsist on a wholly vegetarian diet. In that case his nutrition will consist of a large quantity of various tubers and vegetables. According to Gourou, the inhabitants of such poor districts display an extraordinary skill in utilizing all available wild vegetative life. They eat anything and everything as long as it is digestible. While European man has few types of vegetables from which to choose; 100 different fruits, 50 leguminous plants and



cereals and 50 leafy vegetables are to be found on the Gold Coast.

As prosperity increases there is a tendency to consume highgrade cereals. That there may be only a comparatively small consumption of proteins need not necessarily be a consequence of prevailing poverty. Gourou points out that the inhabitants of Madagascar, owners of comparatively large livestock farms, prefer rice, cassava and maize as the principal constituents of their diet. As income increases some vegetable fats may be substituted by fats of animal origin. Throughout the entire tropical zone, the proportions of carbo-hydrate nutrition – in the form of groundnuts, cereals, vegetables and fruits – represents 80 to 90 per cent. of the total caloric value of tropical man's diet. Rice is a principal element of this diet and thus a principal product of domestic agriculture.

World rice production is almost entirely derived from Asia. If this production is taken as 210 million tons (1956), 200 million tons were produced in Asia. China and India are the principal producers, contributing 82 and 42 million tons respectively. Indonesia's share, on the other hand, is very small. In Asia rice is by far the most important cereal. Yet in 1956, this part of the world also produced great quantities of wheat, maize, sorghum, millet and other cereals. Actually rice contributes 'only' for 65 per cent. to the Asian cereal production. In seeking the reason for the importance of rice, its nutritive value is of primary importance. Another important fact is that rice is an easily digestible food, easily assimilated by the frequently weak constitution of tropical man.<sup>1</sup>

<sup>1</sup> See Wickizer and Bennett, *The Rice Economy of Monsoon Asia*, 1941.

Another reason for the significance of rice in Asia is the fact that within certain limits rice can be grown under very divergent circumstances of climate, soil and water resources.<sup>1</sup> The Asian farmer – notwithstanding his poor equipment – adapted in a masterly fashion methods of culture – and varieties planted – to local conditions. The curious aspect of Asia's intensive rice culture is that on the one hand that culture is dependent upon the dense population and on the other hand, it makes that population possible, because of its high yields and high nutrition values. Rice has a very high yield per acre in comparison to other cereals. In Japan, for instance, from 1946 up to and including 1956, wheat yielded an average of 1,600 kg. per hectare (1,400 lbs. per acre) as against approximately 3,900 kg. (3,400 lbs.) of rice. In India the figures respectively were 600 kg. and 1,100 kg. per hectare (500 lbs. and 1,000 lbs. per acre). It is obvious that this high yield is of prime importance especially to the small Asian farmer who, in some countries, has not more than 1 ha. ( $2\frac{1}{2}$  acres) of land at his disposal. Taking into consideration the small wants of the Asian population it becomes apparent why half of the world population can live on one-tenth of the earth's agricultural surface.

Not only is rice thus of great nutritive value but, it appears to have a high yield per unit of area. There is thus, in economic jargon, a 'comparative advantage' in producing it for export in exchange for other goods. This is an example of international specialisation and trade.

However, there are other economic aspects which are of importance with regard to rice production. These include the low cost of planting, the small risk of harvesting – com-

<sup>1</sup> See Eikichi Iso, *Rice and crops in its rotation in subtropical zones*, Tokyo 1954.

pared with risks involved for other crops – the practicability of storing reserves and the small capital needs – small quantities of seedlings – combined with a high labour intensity.

There are considerable differences between country and country in the man-hours required for rice cultivation. The extremely elaborate sawah (rice field) culture in Java demands an estimated 1,500 man-hours per hectare (600 man-hours per acre). In view of the fact that every ear of rice – there are between  $\frac{1}{2}$  and 2 million rice plants per hectare (200,000 to 800,000 per acre) – is cut separately with a small knife, this harvesting alone requires some 300 man-hours. The consumption of seeds for planting is low, but only at the cost of a large number of man-hours. Seedlings, cultivated beforehand on separate plots are planted by hand. The seed consumption would be twice or three times higher if the seed rice was broadcast directly in the rice field. In Surinam the number of man-hours recorded for domestic rice growing is 1,000 to 1,500 per hectare (400 to 600 man-hours per acre).

The rice plant needs an average growing-period of 150 days before harvesting. Recently attempts have been made to shorten this duration because rice varieties which only require some 130 days to mature, leave enough time for a second crop to be grown each year. This, however, is out of the question for the small Asian producer. It is clear from the foregoing figures that the Asian farmer will have difficulty in cultivating his 1 ha. ( $2\frac{1}{2}$  acres).

An increase in rice production per hectare is possible by employing certain techniques such as seed selection, mechanization and the elimination of weeds and insects. Selection may, for instance, be aimed at shortening the growing-period while retaining a sound product, at strength-

ening the straw which is often not firm enough especially of the varieties cultivated in India, and ultimately at increasing the number of grains per stalk. In addition to the activities of various research centres in Asia, among them at Bogor, research in this field has been undertaken in the United States of America. Between 1940 and 1944 there was a rapid development in methods of chemical eradication of weeds. This method of eradication is fairly expensive, not only because of the price of the chemical agents, but also because the quantity and manner of application must first be determined experimentally for each chemical and for each type of weed.

Rice production may also be increased by means of mechanization. It was not until after the Second World War that important data were collected regarding the potentialities of agricultural mechanization in the tropics. The lag as compared with mechanization in the temperate zone may be largely explained by the fact that in the 'thirties' tropical estate agriculture – the most suitable for mechanization – had sufficient manpower at its disposal. The stimulus to carry out experiments and research work was thus lacking. Furthermore, from a technical point of view perennial cultures – the cultures that estate agriculture prefers – offer little opportunity for mechanization. Consequently, after the last war, it was on mechanization for such quick-growing crops as rice, sorghum and groundnuts that attention was focussed.

The Wageningen project in Surinam deserves mention as one of the principal examples of mechanical rice growing in the tropics. Now that the drawback of flattening the rice to be harvested with a combine has been overcome by the use of a new cultivated variety, mechanization has proved

possible both from a technical and an economic point of view. Compared with a harvesting period of 300 hours per man per ha. (120 hours per man per acre) in Java, the harvesting period at Wageningen normally takes only two to three hours. The entire production of 1 ha. of paddy – from planting to harvesting the rice – demands only a fraction of the time required by ordinary manual labour.

Root and tuber crops, such as sago and cassava are in addition to rice, of major importance for the sustenance of tropical man. We shall only say a few words about cassava. This typical 'poverty crop' takes an important place in the domestic agriculture of Indonesia, the Belgian Congo, Nigeria and Brazil. It is a crop characterized by low cost and high yields per acre. For this reason – in Sumatra for instance – it could become an industrial product, processed into tapioca.

In the event of the failure of the rice crop, cassava becomes an important substitute. It is easily conservable, it can be left in the soil, and can be harvested the whole year round. In the event of a crop failure of potatoes in Western Europe, a not inconsiderable demand arises for the dried product as fodder – the product is called 'gaplek' in its minced and dried form – so long as its price is lower than inferior quality maize. The question whether mechanization for cassava production is feasible is as yet unanswerable. Yields range from a few thousand kilograms per ha. in primitive agriculture to 50,000 kg. per ha. (44,000 lbs. per acre) in estate agriculture.

But domestic agriculture also plays its part in the marketing and export of commercial products.

The production of domestic rubber in the outer provinces of Indonesia may serve as a first illustration. In 1936, this culture exclusive Java, covered 700,000 ha. (1,750,000 acres), 300,000 ha. (750,000 acres) of which were in production. In 1938, exports totalled a value of 60 million guilders. By its very nature rubber makes fairly heavy demands on the financial capacity of the small producer, as it takes the rubber tree quite a few years to come into production. On the other hand, the production is not so labour-intensive.

The price trend of other products – specifically food crops – will normally have a considerable influence on the supply of domestic rubber. Once there is a declining yield from other outputs, a rapid increase in the supply of native rubber can be expected. In general, the supply of the producing areas is strongly elastic because only some of the trees are brought into production, the other ones being ready to be tapped immediately.

Commercial domestic agriculture is not confined to perennial crops only. In Surinam for example the rice cultivation of the Hindu family enterprises in the northwestern part of the country deserves mention. As has been indicated rice is normally a typical product of domestic agriculture produced on small holdings with poor equipment. Here, however, increasing commercialization is followed by an increasing number of draught-cattle and of modern technical equipment. The table on page 53 indicates this.

The agrarian production of this district will become increasingly important to the Surinam balance of payments. But the drawback of monoculture – in this case rice – makes future development extremely susceptible to economic tendencies.

TABLE 3. Agriculture in the Surinam rice district of Nickerie

	1943	1947	1952
Planted area in ha. . . . .	3,538	5,600	6,620
Land worked with draught-cattle (in ha.)	1,757	4,000	2,150
Land tilled by manual labour (in ha.) . .	1,757	1,360	577
Mechanically tilled land (in ha.) . . . .	24	240	3,893
Draught-cattle owned . . . . .	982	1,600	2,013
Tractors owned . . . . .	6	20	128

Puerto Rico's sugar production rests partly on the labour of small farmers of Spanish origin, who imitate the methods of the large sugar enterprises. The cultivation of sugar cane has always been favourable in this region. Credit for such cultivation was always readily obtainable and processing and marketing have never presented great difficulties. Consequently, the area planted with sugar cane covers more than 50 per cent. of the total acreage assigned to domestic agriculture.

As is well known, one of the principal economic hindrances to a sound domestic agriculture is the fact that many tropical products need to be processed and processing plants are thus needed. The investment cost are prohibitive to the small farmer. In contrast to the temperate zone, a sound co-operative system is lacking. The future of domestic tropical agriculture will largely depend on a successful combination of co-operative processing and individual production.

In many tropical areas such as Puerto Rico poultry farming is of more consequence than cattle farming. The following example illustrates the cost and returns of one chicken farm.<sup>1</sup> An investment of US \$ 2,500 – at 1954 prices –

<sup>1</sup> Information derived from *Bulletin 117* of the Agricultural Research Station of Puerto Rico.

proved adequate for an enterprise with 10,000 chicks. The gross turnover per 1,000 chicks amounted to US \$ 1,200. This included a sum of US \$ 500 for foodstuffs and a sum of US \$ 80 for wages. It was found that a net return of US \$ 225 per 1,000 chicks could be attained. The net hourly wage, calculated per 1,000 chicks, amounted to US \$ 2. Quite obviously these figures compare very favourably with the normal income from other types of tropical domestic agriculture. There are two important factors which have influenced the attainment of such a high remuneration per hour of work. The first is the encouragement by the authorities in Puerto Rico of domestic agriculture. The second is that chicken prices were enhanced because of a prevailing meat shortage. This situation is exceptional; in general, poultry farming in the tropics is only undertaken to provide for local needs.

In the foregoing the small size of farms as well as the limited choice of crops will have been noted. In referring to the consumer habits of tropical man, the small margin possible for savings out of his income was pointed out. Accordingly, the financial structure of the small tropical farm will rarely be favourable.

The family cannot provide the capital needed for expansion. Credit obtained for production is frequently, out of sheer necessity, used for consumption. There are scarcely any savings. Cash and liquid assets are only available for a short time after the harvest. Production can only be regarded as altogether remunerative – in the sense of a surplus of output over and above costs – if the cost of the family's labour is ignored. Because of lack of funds it is seldom possible to plant a perennial and well-paying crop on the limited acreage



under cultivation. Its growing period, during which there are no returns, is too long. With purchasing and marketing, moreover, the individual tropical farmer is always the weaker party. Factually, they are often marginal or sub-marginal producers. In these circumstances the practicability of expansion and improvement depends almost entirely upon the human factor – and that factor is seldom sufficiently strong.

However all over the tropical zone experiments are under way to find new possibilities. Since 1946 various types of modern 'peasant' farming are being studied at the Imperial College of Tropical Agriculture in Trinidad. The principal aims are high productivity per acre as well as per man-year while the capital investment must not be beyond the reach of the typical peasant. Full-time employment for the peasant should be provided for. With great care some five types of holdings were established, a.o. one manual-arable holding of 3 acres with one milking cow, a market gardening holding of  $1\frac{1}{2}$  acre and a small dairy farm. The yields and revenues were not unsatisfactory but with an average tenant capitalization of £ 200. (B.W. I. \$ 1000.) per acre, these units were much more endowed than is usual for peasants in Trinidad. Moreover one should not omit the influence of constant supervision and guidance.<sup>1</sup>

<sup>1</sup> See *Peasant Farming*, by A. Jolly, Caribbean Commission 1954.



## Chapter V

### THE COST PRICE IN TROPICAL ESTATE AGRICULTURE

We want first to outline in a few words the difference between estate agriculture and domestic agriculture. The term 'estate' is used in preference to the now demoded term 'plantation' agriculture. But the terms are more or less synonymous. Many tropical countries have no legal definition of either terms. India defines 'plantation' according to the Plantation Labour Act 1951, as 'a plot of land of 25 acres or more, used for the cultivation of tea, coffee, rubber or cinchona, on which thirty or more labourers are at work'. This Act may also be declared as applicable to other cultures.

At a meeting of the Commission for Plantation Labour of the International Labour Office which took place at Bandung in 1950, delegates were hard put to it to determine the greatest common divisor for the divergent opinions existing as to what a 'plantation' meant. The definition which was unanimously approved by the plenary conference – with the reservation that definitions in existing national laws should be regarded as unaffected – was that a plantation is an agricultural enterprise operating with waged workers which is situated in a tropical or subtropical area, engaged in cultivation and production for commercial purposes of certain products, more narrowly defined in the resolution. Plantation production normally involves production for foreign markets – an aspect not mentioned in the above definition.<sup>1</sup>

<sup>1</sup> See *Plantations and other centrally operated estates*, Rome, 1955.

Despite the progress in agricultural techniques and agricultural chemistry there is yet no indication that the labour-intensive character of plantation agriculture will be modified in the near future. For example on January 1, 1956 the Belgian Congo had 900 plantations with an acreage under cultivation of 50 hectares (125 acres) or less, 500 plantations of 50 to 250 ha. (125 to 625 acres) and 245 plantations of more than 250 ha. (625 acres) each. The total area in production was 340,000 ha. (850,000 acres) with a total labour force of 240,000. The latter figure is a sufficient indication of the labour-intensive character of this type of agriculture.

It has been frequently suggested that the manpower of one worker is required as a minimum per  $1-1\frac{1}{2}$  hectare of cultivated land. It follows that the supply of labour is of major importance to the existence of the plantation. The question of labour-supply is thus the keypoint in the economic history of many tropical countries. The question whether a mere numerical supply of labour is available is not so important as the question how costly and how efficient this labour-supply is. Labour-cost nearly always constitutes the principal cost factor.

Production costs are normally considered as relatively fixed costs. Thus a decrease in production of 10 per cent. does not result in a decrease of cost of production per hectare of 10% but of much less. Herein lies concealed one of the main economic difficulties – both now and in the future – involved in plantation agriculture.<sup>1</sup> Due in part to various social measures, labour-costs are tending constantly to increase. Prices of plantation products tend to fluctuate widely. In view of both these factors it is likely that

<sup>1</sup> See Plantations in Africa, *Statistical and Economic Review* No. 9, March, 1952.

private enterprise will often display little interest in further development of plantations.

Next we shall consider a very important problem of tropical development, viz. the cost price in agriculture. As points of departure for this examination we summarize our opinion on the economic concepts regarding tropical development as follows:

1. The structure of the economic life of the underdeveloped country differs little from that of the more-developed country. We speak emphatically of the structure, not of the level of income.
2. Both types of country frequently base their social and economic policy on a general development plan.
3. In both types of country this policy aims at a quick increase of national income per capita. In the underdeveloped country the differences between agrarian and urban income are considerable. There are moreover great inequalities in the distribution of agrarian wealth.
4. For both types of country the marketing of products forms the key-point of the economic policy. In an underdeveloped country there will be more agrarian than industrial products.
5. In both types of country the crucial consideration for marketing is the cost price of the product. If a market price over and above cost price level cannot be realized, then there is no economically justifiable basis for producing that product. Numerous factors, including those of a monetary nature, influence the cost structure.
6. In general, the potentialities of domestic markets in an underdeveloped country are limited. Production for foreign markets should consequently be the bases of

economic policy. Many tropical products are sold on a buyers' market with speculative elements. The tropical country itself can rarely exercise any influence neither on the market nor on transport cost. The ship-owners live in the U.S.A. and in Western Europe. The pursuit of greater prosperity must be largely concentrated on the control of those elements which deal with the cost inside the country (free on board).

7. Cost price control policy is the same for the more-developed and for the under-developed country. By cost price is meant the money expenditure made in the course of production so far as this expenditure is necessary, inevitable and determinable by amount. Such a policy should aim at keeping the cost price as competitive as possible.
8. In its policy of cost price control under-developed countries often pay insufficient attention to monetary policy. One should give serious consideration to the possibility of exercising deflationary pressure on the wage and price levels and to the direct and indirect effects thereof on the country's economy.<sup>1</sup>
9. The effects of a cost price control policy are of great importance to the future trends of the balance of payments. A favourable cost price structure may result in more exports and consequently permit more capital imports.

Next we concern ourselves with some of the technical and economic considerations of a number of products. These considerations include the requirements of planting and upkeep, the labour requirements and the investment cost – including cost of eventual processing.

<sup>1</sup> See Chapter XI.

### 1. *Oil palm*

The oil palm begins to flower when it is three years old and may start to yield in its fourth year. Considerable expenditure is involved in its cultivation. Harvesting consists of cutting off the fruit clusters. The fact that only male workers are capable of this heavy work has consequent repercussions on the labour supply. The yield reaches its peak after ten to twelve years. In order to make the picking 'socially' acceptable, certain countries constantly seek to plant varieties that produce well and yet do not grow too tall.

The average output of a well-kept cultivated area amounts – in terms of processed product, that is to say oil – to between 800 and 1,200 liters per ha. (approximately 85 to 126 gallons per acre). In 1958, first quality palm oil realised a c.i.f. price of £ 85 per ton. The oil content is estimated at 20 to 30 per cent. of the weight of the fruit. In connection with transport cost, the practicability of storing the palm oil for a certain period is of importance. Transport cost to the landing stage representing 25 per cent. of the total charges are by no means exceptional. Since palm oil is now preferably shipped in bulk, it must be heated before shipment to conform with certain quality requirements. Consequently, large storage tanks that can be heated are encountered in the ports of shipment, and these tanks naturally involve a substantial capital expenditure.

The favourable prices of oils and fats after the Second World War considerably encouraged small-scale oil palm plantings. Through the initiative of a large concern simple processing plants can be bought. The marginal production of such units is 100 to 250 ha. (250 to 500 acres), and it cost, at 1958 prices, some £ 15,000.

If sales can be guaranteed, the oil palm gives tropical domestic agriculture an opportunity to engage gradually in a relatively stable business. There is scope for co-operative production while marketing should preferably be handled by a large-scale enterprise. An attractive opportunity presents itself for the stimulation of domestic agriculture.

## 2. *Copra*

This product is obtained from ripe coconuts. Coconut palms are encountered in nearly all humid and warm regions. During the first years after planting the cost of upkeep are considerable. On good soil the palm first bears fruit after six to seven years, attaining its full yield between the 10th and 20th year. On average the coconut palm is fertile for about 40 years. A 1 ha. ( $2\frac{1}{2}$  acre) plot, planted with more than a hundred trees, will yield between 4,000 and 6,000 coconuts. From these nuts, in turn, between 600 and 1,000 kg. (1,300 to 2,200 lbs.) of copra are extracted.

Every part of the coconut palm, fruit, trunk, fiber, etc., can be of economic importance and utilized, provided the part in question has a certain economic value locally. In view of the difficulties involved in picking the nuts at heights ranging up to more than 100 ft, constant attention has to be given – for systematic production at any rate – to the height of the tree and the cost of plucking.

Copra, like palm oil, takes an important place in the oil and fat supplies of the more-developed countries. In the 'thirties' there was an extremely rapid development in the processing techniques of oils and fats, with the result that now in a technical sense all of the following are interchangeable, namely olive oil, coconut oil, groundnut oil, soya bean oil, palm kernel oil, cotton seed oil, linseed oil,

palm oil and whale oil. Normally the price level of some of these oils is prohibitive for substitutions, e.g. of olive-oil. Marketing research on the world market for oils and fats will be very difficult. An exceptional shortage in one oil can be reduced by using one of the many substitutes. Prices fluctuate much.

Considered in this light, there was nothing exceptionally irregular about the price trend of coconut oil in London, which amounted to approximately £ 50 per ton in 1920, approximately £ 15 per ton in 1934, £ 80 per ton in 1956 and £ 95 per ton (European ports) in 1958.

### 3. *Rubber*

Naturally the development of manufacturing techniques greatly influenced rubber production, particularly following the invention of the pneumatic tire. This perennial culture makes slight demands on the soil but is susceptible to wind damage. Great care must be given to the different stages of the production process and much work is involved. The treatment of young plantations is aimed at furthering its rapid growth. 'The aim is that the plantings be tapped as soon as possible because if the rubber tree is ready for tapping a year earlier – that is so to say that the tapping stage is advanced by a year – this not only means that the production of the first tap year will be available earlier, but also that the still increasing production of the next eight to ten years will be attained a year ahead. It is therefore a question of balancing the extra-production to be expected against the extra cost in the form of selection, manuring and upkeep'.<sup>1</sup> The Hevea rubber tree can generally be tapped when it is

<sup>1</sup> See van Hall, *De Landbouw in de Indische Archipel*, Part II. (An outstanding description of tropical agriculture in Dutch).



five to seven years old. Grafted Hevea plantings can produce 1,000 to 2,000 kg. of commercial rubber per ha. (800 to 1,760 lbs. per acre).

The organizations of rubber producers – they were compelled to organize during the depression of the ‘thirties’ – have been painstaking in drawing up a uniform cost price calculation, although capital cost – in this case the interest on plantings not yet in production – have not always been taken into account.<sup>1</sup> Depreciation on fixed assets was assessed at  $7\frac{1}{2}$  per cent. a year. Land and plantations were written off at a rate of 4 per cent. The following rough calculation for Java rubber, drawn up in 1929, gives an idea of the composition of the cost price.

TABLE 4. Cost price of rubber in cents per kg. (Dutch guilders)

1. Upkeep of plantings . . . . .	5.8	11. Overhead expenses . . . . .	2.8
2. Combatting insects . . . . .	1.7	12. Transport cost to port . . . . .	1.4
3. Tapping cost . . . . .	11.9		
4. Processing . . . . .	3.7		52.3
5. Packaging . . . . .	2.7	Subtotal	
6. Maintenance of buildings . . . . .	3.0	Depreciation and redemp-	
7. Recruitment of workers . . . . .	0.4	tion . . . . .	13.9
8. Miscellaneous . . . . .	2.9		
9. Salaries . . . . .	6.8	Total . . . . .	66.2
10. Interest . . . . .	9.2		

It is noteworthy that the actual production cost – listed under 3, 4 and 5 – comprise barely 25 per cent. of the total cost. In 1940 the selling price, influenced by the depression and by restrictions, had dropped to 29 cents per kg. After the Second World War there was also a considerable increase in the labour charges for rubber.

According to the ‘Tea and Rubber Mail’ of November 24,

<sup>1</sup> *Le Caoutchouc dans le Monde*, Rome, 1945.

1955, the share of wages, salaries and social charges in the f.o.b. price amounted to about 70 per cent. The price of natural rubber (United Kingdom) rose from 1 shilling per pound in 1948 to 2 shillings or 100 Dutch cents per kg. in 1958.

#### 4. *Coffee*

*Coffea arabica* is distinguishable in two varieties, viz., strong and mild. The first is offered for sale in Brazil and the second in Columbia and some other countries. The mild variety is nearly always quoted at a higher price on the product exchange. There are two other types of coffee, viz. *coffea liberica* and *coffea robusta*. The name of the latter denotes that it has a considerable resistance to plant diseases. It is a product of the Belgian Congo.

The fruits containing the coffee beans make their first appearance five to seven years after planting. The maximal output is produced after 14 to 18 years, following which the yields gradually decline. In the event of two successive climatically favourable years, a good crop may be followed by a bad crop. In general, harvesting takes place throughout the whole year.

The qualities of each type vary according to the divergent natural circumstances and the production and processing methods. From an economic point of view the cultivation of coffee is characterized by the fact that the short-term supply is extremely inelastic. It takes quite a few years to bring a recently planted area in production. Moreover, the share of the labour-cost in the total cost price is very substantial; it is estimated at 75 per cent. As coffee can be stored in large quantities, this enables the inelasticity to be tempered by carry-over.

In estate agriculture temporary planting of short-growing crops in between the perennial crop of coffee is often undertaken. For example coffee is grown with bananas as a catch crop. The purpose is obvious: to reduce the heavy labour charges for both products as much as possible. The following table will give some idea of the layout cost per ha. ( $2\frac{1}{2}$  acres) with a catch crop of 600 banana trees.<sup>1</sup> The amounts are in Surinam guilders. (£ 1.— = 5 Surinam guilders).

TABLE 5. Layout cost of coffee with catch crop per ha. (Surinam guilders)

1. Tree felling . . . . .	80	8. Earthing up bananas . . .	30
2. Drainage . . . . .	50	9. Replacing unsound coffee	
3. Planting coffee . . . . .	20	and banana plants, etc. .	56
4. Digging holes . . . . .	30	10. Manuring bananas . . .	24
5. Combatting ants . . . . .	10	11. Planting coffee . . . . .	48
6. Planting bananas . . . . .	90		
7. Weeding . . . . .	90		
	370		528

Activities are thereafter concentrated upon the upkeep until the coffee plant is five years old, while the bananas are harvested in the meantime. Next, the coffee is brought into production. The average decrease in cost as the number of acres planted with catch crop increases is remarkable.

### 5. Tea

The tea plant is cultivated under widely divergent climatic conditions, provided temperature and humidity are favourable. Such suitable conditions are often encountered in the mountainous regions. An important cost element is the

<sup>1</sup> Information by the Section Cultures of the Surinam Trade and Industry Association of Paramaribo.

construction of terraced gardens which check erosion in cultivations laid out on slopes. In general the production process, from beginning to end, demands a relatively large number of experienced workers. Pruning the shrubs, for instance, is a delicate and therefore laborious operation. Plucking, which must be carried out in conformity with a certain seasonal cycle, also requires considerable care. For this reason it is quite understandable that preference is given to female workers.

The tea plant produces its first crop from the third, fourth or fifth year onwards. It is generally found that plantings attain their full yield in the course of the sixth year. Thereafter production continues until the plant is fifty years old. The yield varies from 500 to 1,000 kg. of dry tea per ha. (440 to 880 lbs. per acre). In 1957, this meant a gross turnover of up to £ 400 per ha. (2½ acres).

A broad survey is given below of the cost price structure of tea over two different years.

TABLE 6. Production cost of tea in % of total <sup>1</sup>

	Cost as % of total	
	1938	1948
Salaries of Europeans . . . . .	10	8.2
Plantings . . . . .	9.8	12
Upkeep . . . . .	16	22
Manuring . . . . .	15.4	11.8
Picking cost. . . . .	23.6	24.7
Processing . . . . .	25.2	21.3
	100	100

<sup>1</sup> See V. D. Wickizer, *Coffee, tea and cocoa, an economic and political analysis*, Hanford, 1951, page 467.

This survey also shows evidence of an increase in labour charges.

## 6. Sugar

The production of sugar cane exemplifies how the yield may diminish while the harvest cost per ton remain the same. After the first crop the cane may be cut a second and third time, although the yields decline. In view of the fact that cane generally takes at least a year to ripen, and that allowances should be made for the diminishing yield, four cuts are generally considered as a limit. Although this culture exhausts the soil, at the same time it supplies a large mass of organic refuse so that a physical-chemical equilibrium is maintained.

The economic potentialities of mechanization are gradually increasing. Thus it is now possible to plant semi-mechanically. Upkeep is still largely done by hand. Next to working the soil and planting, harvesting itself is an important element in the cost structure. In the West Indies, a sum of 16 shillings was paid per ton of cut cane harvested in 1956. In Java, average cane yields amount to 100 tons per ha. ( $2\frac{1}{2}$  acres). For Cuban and Congolese enterprises yields of respectively 150 and 60 tons per ha. (60 and 24 tons per acre) are recorded.

In general, the production per acre will be smaller in the tropical zone than in the temperate zone. With sugar, curiously enough, there are two different crops which supply the same final product i.e. sugar-beet and sugar-cane. In the struggle between cane-sugar and beet-sugar the former has managed to hold its own. Of course this is partly due to governmental measures enforced in the various countries. The high labour-cost involved in the production of beet-sugar could not always be compensated for a hundred percent by a high labour productivity and favourable technical conditions. A rough cost calculation for

beet-sugar as well as cane-sugar was drawn up for the year 1925 and is given below.<sup>1</sup>

TABLE 7. Comparative production cost of cane and beet sugar (in gold French francs)

	Net cost to factory	Manufacturing cost of 1 ton of sugar	Total production cost of 1 ton of sugar
Germany (beet)	220.71	132.43	353.14
The Netherlands (beet)	246.14	94.38	340.52
Czechoslovakia (beet)	196.33	93.75	290.08
Cuba (cane)	188.13	101.95	290.08
Java (cane)	129.27	113.72	242.99

In some cases these figures show remarkably wide differences.

In this book we naturally cannot enter too deeply into all the problems of a tropical economy. Nevertheless, we want to pause for a moment to consider an important question, viz. the relation between the volume of production and the earnings. The survey given below relates to the sugar industry.<sup>2</sup>

TABLE 8. Relation between the production volume and earnings

	Number of tons per acre				
	up to 20	up to 25	up to 30	up to 35	more
Number of farms . . . . .	115	142	153	56	97
Total number of acres . . .	391	400	399	405	372
Yield per acre in tons . . .	16.2	22.9	27.8	31.7	41.5
Work-days per ton . . . .	5.4	3.7	3.2	2.8	2.3
Investment per ton in £ . .	7.8	6.0	6.1	6.1	4.5
Interest on investments in %	2.7	6.8	8.6	9.5	12.5
Production cost per ton in £	36.11	30.7	28.2	26.2	24.4
Price realized per ton in £ .	32.10	33.1	33.0	32.4	31.5
Loss (-) or profit (+) per ton	-4.1	+2.6	+4.10	+6.2	+7.1

<sup>1</sup> See *Sugar Economy between the two World Wars*, Rome, 1948.

<sup>2</sup> See H. Behrman, 'Sampling technique in an economic survey of sugar cane production' in *The South African Journal of Economics* of September, 1954.

This small table shows the importance of being a big enterprise in tropical agriculture. As the total number of acres increases, the yield per acre in tons increases. Fewer work-days per ton and lower investment per ton are needed while interest on investment rises. The result of these tendencies in favor of the bigger holdings is both a minimum in production cost per ton and a maximum in profit per ton.

It was the British economist Alfred Marshall who was the first to speak of 'economies of scale'. As such he meant advantages of big industrial enterprise not only where internal economics (cost price) but also where external economics (market-position) are concerned.

This table shows that estate agriculture in tropical areas also benefits from being a big one amongst a great number of little ones.

## 7. *Citrus*

Citrus trees in the tropics bear fruit practically the whole year round. Nevertheless, due to an intensive flowering season as a result of climatic conditions, the annual production may be chiefly concentrated during a short harvesting period. Citrus fruits are oranges, lemons and grapefruits, and of these three categories a large number of varieties are marketed. Production can be considerably increased by effective irrigation, by manuring and by combatting insects. Although this fruit is not quite so exacting as the banana with respect to plucking and transportation, it must certainly be kept in cold-storage if transport lasts several days.

Subtropical areas also produce large quantities of citrus fruits, but in these areas the harvesting period occurs at a much more favourable time with respect to the sale to more-developed countries. The top of the North-African

season is in December when Western Europe is lacking of fresh fruit.

The share of picking and transport in the cost price is rather high. A young plantation begins to produce its first fruits within three to four years and may continue to yield amply for a period of twenty years or more. A plantation producing at full capacity can yield 90,000 fruits per ha. (36,000 per acre).

It is not our intention in this short survey of a number of selected crops to sum up the detailed cost price of each product, but rather to confine ourselves to one or two interesting items. Here we point to the processing cost of citrus fruits for export. The cost price f.o.b. port of shipment proves to be much higher than the cost price ex plantation. In this example the latter may be set at 4,750 shillings for a yield of 55,000 fruits per ha. (22,000 per acre). This means that per crate of 220 fruits a sum of 19 shillings ex plantation is involved. The additional charges are listed in the following table, which relates to Jamaica in the year 1950.

TABLE 9. Cost per crate of citrus fruits in shillings and pence

	s	d		s	d
Wired crate . . . . .	4	6	Transport factory-quay . .	—	9
Paper . . . . .	1	—	Colouring . . . . .	—	4
Labels . . . . .	—	2	Cost on quay . . . . .	—	4
Labour charges . . . . .	1	6	Organization cost, central		
Miscellaneous . . . . .	1	6	processing and marketing	1	—
Transport ex plantation . .	1	9			
			Total . . . . .		12/10

The f.o.b. price will therefore amount to 19/- + 12/10 or £ 1.11.10. Such a detailed cost analysis is useful as marketing of West Indian citrus is conducted by means of long-



term Common-Wealth contracts at fixed prices. The analysis thus keeps its value for the time of the contract.

#### 8. *Banana*

Here two varieties are distinguishable, viz. the plantain, a mealy banana, which constitutes an important substitute for other starchy foods in the various production areas, and the commercial product belonging mainly to the 'musa sapientum' family. Planting comprises a by no means negligible cost element in view of the fact that the banana plant bears fruit only once and then dies. From 10 to 17 months elapse between the time of planting and the time the fruit is ready for harvesting. A system of bedding out the plants ensures a continuous supply. The banana is not a seasonal product. The question of timing the sales plays a large part in the management. The time required for transport determines the date of picking because the fruit is shipped when still unripe and artificially brought to maturity in the country where it is marketed.

With no other tropical product are transport cost of such significance. Transport must take place in a refrigerated steamer and in a cold-storage waggon. Moreover, the supply is fairly inelastic and the production demands expert knowledge. Thus large estate production is common. The yields of estates vary between 20 and 50 tons per ha. (8 to 20 tons per acre), whereas family agriculture generally produces no more than 10 tons per ha. (4 tons per acre).

That the initial costs of estate-agriculture in general, and of banana plantations in particular, are very high, may be concluded from the following statement for British Guiana. The amounts are in BWI \$ which stood at 4 shillings in 1958.<sup>1</sup>

<sup>1</sup> See *Report of the British Guyana and British Honduras Settlement Commission*, 1948.

TABLE 10. Capital investment in a banana plantation

a. Capital cost:	
Research . . . . .	50,000
Purchase and reclamation of lands . . . . .	2,625,000
Road construction (60 miles) . . . . .	770,000
Buildings for 4,000 people . . . . .	3,000,000
Schools, hospitals, etc. . . . .	575,000
Water-supply, etc. . . . .	600,000
Agricultural equipment and implements . . . . .	280,000
	<hr/> 7,900,000
b. Working capital amounting to two years' wages etc.	1,500,000
c. Exploitation cost:	
Maintenance and depreciation . . . . .	557,000
Combatting of diseases and weeds . . . . .	120,000
Wages and salaries . . . . .	1,700,000
Social provisions . . . . .	85,000
Miscellaneous . . . . .	287,500
	<hr/> 2,750,000
d. Revenues:	
100,000 acres à 5,000 kg. (11,000 lbs.) . . . . .	3,840,000
e. Returns minus exploitation cost . . . . .	1,090,000

Returns are nearly 14 per cent. of the total investment, which is estimated at \$ 8,000,000. The selling price is some \$ 80 per ton.

### 9. Tobacco

As a final example of the cost price in estate agriculture we give the following figures relating to tobacco in Northern Rhodesia.

Compared to other crops, the share of labour cost is rather small. (Table II)

We have given some figures of cost of various tropical products. These figures have not been presented in a uniform manner so that they cannot be compared. But, in general, they indicate the following conclusions:

TABLE 11. Cost price for estate tobacco <sup>1</sup>

	in % of total
Workers' wages (of which 13 % is paid in kind (food etc.)) . . . .	40
European salaries . . . . .	16
Transport . . . . .	10
Depreciation . . . . .	7
Manuring . . . . .	6
Marketing expenses . . . . .	4.5
Maintenance (other than of transport) . . . . .	4
Other cost . . . . .	12.5
	100

<sup>1</sup> See W. Haviland, 'The economic development of the tobacco industry of Northern Rhodesia' in *South African Journal of Economics*, December, 1954.

1. 'Estate' agriculture offers better chances than 'domestic' agriculture for a rapid economic development and for a short-term increase of the national income of an underdeveloped country.
2. Very substantial investment is necessary to start tropical estate agriculture. Several hundred thousand pounds might easily be the capital requirement for a moderate sized estate.
3. It is preferable for new estates to be financed predominantly with private rather than public capital. Numerous technical and financial setbacks may be expected. Fixed cost – i.e. those cost which do not vary with the volume of production – are high. Considerable fluctuations in the world market prices are possible. Financing with public capital, necessitating governmental interference in management and policy, slows down administration and prompt business-like decisions.
4. Agricultural planning should include a close scrutiny of

available labour and of market potentialities and should attempt to integrate production with transport and marketing facilities. One and the same firm should, looking at it from a pure economic point of view, both produce and transport as well as sell the product in order to keep the cost price on a competitive level.

5. The cost price aspect must be a fundamental component of the policy of the individual enterprise as well as of the government. Cost prices will have to be controlled and experience has shown that this is possible. Governmental action will lie specifically in the monetary field. We shall return to this later, discussing some aspects of monetary equilibrium in Chapter XI. Individual enterprises must reduce cost to the minimum by careful planning and by the elimination of all wasteful and non-essential expenditure.

## *Chapter VI*

### SOME INDUSTRIAL AND COMMERCIAL ASPECTS OF TROPICAL AGRICULTURE

The tropical country usually has an agrarian structure but often there are few possibilities for a quick expansion of domestic agriculture. Thus it is understandable that a great deal of attention is focussed on the possibilities for a quick industrialization. We want briefly to review these possibilities. By the way, it should be realized that some recent symptoms in the economic life of tropical countries arise from non-economic motives. There might be, for instance, an urge for industrialization because many young people dislike working in agriculture. They flock to the towns creating a rapidly expanding urban unemployment. This group, which is of political importance to a democratic government, demands acceptable work. Thus the economic aspect is obscured by the political one.

In many a tropical country the actual stock of capital goods – the plants, machinery etc. needed for production – is often small and deteriorated. This may be caused, partly, by the lack of a heavy industry, capable of providing the necessary quantities of iron and steel. Such shortage of capital goods may also be due to the structure of the balance of payments, which, in many cases, leaves no scope for the import of capital goods. Furthermore, investment may be insufficient, even with the aid of foreign credit, to allow the purchase of up to date machinery. Moreover, in an under-developed country the actual use of mechanical devices is



restricted as a result of a number of factors such as a lack of skilled labour, a lack of working capital, defective organization and techniques and the small size of local enterprises. Wherever mechanization has been introduced in tropical countries, there is often a technological arrearage in comparison with the more-developed countries. Mechanization is often confined to the non-agrarian sectors such as mining, industry and transport.

In a primarily agricultural economy the possibility of mechanizing the agrarian sector is of great importance. The small size of the average agricultural holding however impedes progress in mechanization. Unless small farmers are able to use agricultural machinery on a co-operative basis, it is only estate agriculture which utilizes the machine to increase production per acre. There are many factors which influence the profitability of mechanization of domestic agriculture. There is the human factor, the size of the holding, the terms of the credit needed to buy the tractor et cetera.

The existing industry in under-developed countries is usually confined to the processing of agrarian products into consumer goods. As a rule, a certain amount of governmental support is required to maintain such industries. This may either take the form of direct financial aid or of commercial-political measures such as import restrictions or export subsidies. Local processing is mostly characterized by the intensiveness of labour and the extensiveness of capital. Examples of such industries are rice-hulling mills, oil-crushing installations, coffee-roasting factories, sugar mills, match factories, tobacco factories, breweries, ice plants and textile factories including weaving-mills and dye-works.

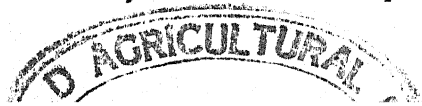
The choice of a locality for a new plant is often difficult

because of the scarcity of transport facilities to bring in the raw materials and to take out the finished products. The traffic system may often be defective and the transport cost of the raw materials may be high. This is particularly true as regards the industrial processing of agrarian products. Sometimes the transport cost to the main consumption areas in this particular branch are quite prohibitive.

Consequently, much small-scale primitive processing by individuals goes on. The bulky character of the agrarian raw materials in question aggravates, as we mentioned before, the transport problem. Labour, too, is a difficulty. Labour in the tropics is characterized by low productivity, considerable mobility – the worker does not like to stay too long on one and the same job – and a shortage of skills. Another factor detrimental to production is the insufficiency of investment – as a result of the small savings mentioned earlier – leading to possible under-capitalization and to insufficient reserve funds for depreciation and recession.

From the economic viewpoint many agricultural industries are therefore far from ideal. They suffer from lack of private capital, a lack of working capital, and often from an erroneous purchase and sales policy with a consequent disproportionate stock-piling and too low a rate of turnover. Interest rates for credit, especially for long-term credit are usually very high. This, added to the high wage level in relation to low labour productivity and high purchase prices for raw materials because of high transportation cost frequently results in a high cost price of the product.

As far as the marketing of such products is concerned, the principle obstacle to marketing in the home country is the small demand on which advertising and other forms of sales stimulation can have only little effect. Frequently the



foreign marketing potentialities are strongly – and adversely – influenced by the high transport cost, the protective tariff policy of the importing country and by the fact that the currency of the importing country is scarce.

The industrialization programmes normally put forward by planning authorities may envisage the use both of local and of imported raw materials. Processing of domestic raw materials and agrarian products should have a certain priority as it leads to a reduction of imports and of foreign currency requirements as well as to an increase in the value of exports.

Although in many tropical countries the large enterprises are still owned by foreign companies, the establishment of medium-sized industries is already being undertaken in certain countries with private domestic capital supplemented by some governmental participation. Whenever a new type of heavy industry is to be established the project is usually financed by public funds. As such may be mentioned plants for the generation of power, whether within the frame of a so-called multi-purpose project or not. Some countries are now seeking to develop and enlarge cottage industries because of the difficulties that we have noted with regard to large scale industrialization. Proceeding from the fact that the family of the farmer is already a productive group, efforts are made to stimulate the manufacture in rural households, of durable consumer goods such as textiles and household products.

All countries strive towards a favourable development of their balance of payments. This aim is made possible to a greater or lesser extent because of the international division of labour. That is to say, each country offers for sale abroad



those products which it can produce at the most favourable cost price; thus the international exchange of such products is to the advantage of all countries.

The international exchange of commodities is influenced, however, by a number of factors which are to the detriment of the under-developed country. And a rise in exports is of just as vital importance to this type of country as to a more-developed country. Exports from tropical countries are hampered, among other things, by:

1. Deficiencies in the economic life of the exporting country.
2. Import restrictions of the importing country.
3. Transport difficulties.

We have already mentioned some factors which affect the export potential of under-developed countries. In a following chapter we shall emphasize the importance of monetary factors. It should be borne in mind, however, that in fact all aspects of a country's economic life are interrelated and thus the national economic system as a whole influences the export potential. If Japan succeeds in delivering its merchandise to the remotest corners of the world, this is not only due to its well-developed cottage industries and to its wage level deliberately kept very low, but also to its economic power as a whole. And if the United States of America are the greatest exporters in the world, that fact is not only due to high labour productivity and low cost prices, but also to the drive of a young and technically-minded nation. Now the under-developed country has very little of all this to offer and exports are therefore a point of constant anxiety to the authorities concerned.

Unquestionable the struggle of tropical countries to attain

greater prosperity and to increase their exports is yielding results. Nevertheless, the progress made by these countries is much smaller than that in Western industrial countries. From the annual report of the organization administering the 'General Agreement on Tariffs and Trade' (G.A.T.T.) for the year 1955, we quote the following passage:

'In 1955, the exports of the industrial countries were chiefly responsible for the overall increase in value of world exports. There was a further decline in the relative importance of exports of the non-industrial countries. As was the case in 1954, the relation between the increase in exports of non-industrial countries and those of industrial areas was approximately 1 to 3 in 1955. Consequently, the contribution made by non-industrial countries to world exports dropped from 37.9% in 1953 to 37.2% in 1954 and to 36.3% in 1955. This development can be ascribed to the export movements of the non-industrial countries and occurred notwithstanding a significant improvement in the basis of exchange of raw materials against industrial products.'

The resistance encountered to the importation of tropical products into industrial countries can have several causes, some of them are enumerated below.

First we take the case that the commodity offered for sale is not a raw material but a semi-manufactured article or a finished product. The industrial country may have built up its own industry in this field. This is one of the causes of the serious difficulties that already exist and may still be expected in future. This means that one cannot be too sure that the standardization of the product and the improvement of its quality will give the tropical producer a strong position in the market. The more-developed country finds itself often

confronted with an intensive industrialization programme in its own country in which there is seldom a margin for imports of industrial products from a former colony. Furthermore, in the dictation of commercial policy, the influence of private business – which wants no competition from abroad – is relatively great in numerous of the more-developed countries, not only in the United States of America.

But it is not only expansion of industrial countries that can hamper exports of tropical areas. The above-mentioned G.A.T.T. report indicates, for example, that the recession in the textile industry of the industrial areas contributed to the decline of exports in the non-industrial areas. According to this report, if the textile production in industrial countries had increased to the same extent as world textile production, an additional quantity of natural fibres with an approximate value of U.S. \$ 500 million would have been exported in 1955 from the non-industrial countries to the industrial areas.

Another cause of the smaller demand for tropical products is the fact that they are substituted by those products which are produced in the more-developed areas themselves. These areas produce more natural raw materials and fuel. Moreover – according to the G.A.T.T. report for the year 1955 – the ratio between the consumption of natural raw materials and fuel on the one hand and the gross value of the industrial production in the more-developed areas on the other, dropped from 25% in 1938 to 19% in 1952 and to 17.5 in 1955.

It may be pointed out incidentally that the industrialization of one tropical area can also damage the economic potentiality of another. The conflicts arising between tropical countries

— as such may be mentioned jute manufacture as a bone of contention between India and Pakistan — can seriously impair the attempts to gain greater prosperity. World trade with its innumerable ramifications brings many countries together. It might also similarly exclude specific countries — and these are then often the weakest from an economic viewpoint. The attempts towards economic integration between the more-developed countries, we think of common-markets and of bi-lateral trade agreements, not infrequently deprive the tropical country of attractive marketing opportunities.

Another important cause for the ever widening decline in world trade is indicated in the afore-mentioned G.A.T.T. report. That is the strong increase in production of synthetic raw materials. This production which found its origin in the scarcity of natural raw materials caused by the Second World War, showed a further rise after this war as a consequence of the considerable increases in the price of natural raw materials. After 1950, the production increase of synthetic raw materials was approximately double that of industrial products. Without these synthetic raw materials the demand for natural raw materials would probably have been 40 per cent. higher than it actually was.

Of considerable importance to tropical development are the shipping connections with industrial countries. Export opportunities are frequently lost because there is inadequate cargo space, the ship arrives too late and space is insufficient or because — and this is the chief reason — the freight rates per ton or per cubic feet are too high. The latter applies specifically to goods which show a relatively low value/volume quotient such as agricultural commodities. It is quite conceivable, for example, that because of defective

shipping connections, the transport cost per m<sup>3</sup>. of a new supply of tropical timber may be as high as the local production cost of that timber. Normally the tropical country has only one or two good seaports. It is thus understandable that the authorities of a tropical country are often prepared to subsidize freight charges as such, for then they can be assured of sufficient shipping while the quality can be controlled at the few ports of shipment which function as central depot. They prefer this to subsidizing products at the point of production.

Attempts to give more stability to the tropical branch of international trade were already made in the 'thirties' of this century. These attempts met with little success, because of the nationalistic self-interest policies of the producing countries. They did, indeed, conclude a 'convention' create a 'fund' or impose a 'restriction' but – in the case of pricing coffee for example – they entered upon an excessive expansion of production knowing full well that only the price and not the quantity was fixed and that Brazil, for the sake of self-preservation would be forced to pull the chestnuts out of the fire. In 1958, most of the coffee-producing countries agreed to reduce their exports in order to keep the world market price on a satisfactory level. While an economic crisis running its course, in the long run leads to the elimination of the weaker producers, the regulation of production by the different governments often leads to a situation of undercapacity for all producers and the bigger the degree of undercapacity, the higher the cost price becomes.

After the Second World War, new attempts were made. The Wheat Agreement of 1948, for instance, tried to unite two

objectives which, until then, had generally been regarded as incompatible. These were (a) to guarantee producers a fixed income and (b) to expand world trade. The exporting countries pledged themselves to supply annual quotas against fixed prices, while buffer stocks are formed. Nevertheless, in the period 1945-1958, such agreements were only carried into effect for wheat, sugar and tin. Nationalism and group interest are as much alive as ever. This is evident by the policy of the so-called long term contracts.<sup>1</sup> These contracts are used in the British Commonwealth to guarantee a price for agricultural products for a long term period up to 15 years. Farmers outside the Commonwealth thus have lesser opportunities for marketing.

Another interesting aspect concerns not the long term but the short term price modifications – and for the producer, therefore, the income modifications – of certain tropical export products. An attempt was recently undertaken by Bauer and Paish to establish a policy to reduce the price fluctuations of cocoa, produced in domestic agriculture at the Gold Coast.<sup>2</sup>

Their argument is based on their condemnation of the policy of the marketing boards for cocoa, groundnuts etc. on the West Coast of Africa. These boards collect and sell the cocoa of the small farmers who receive only a part of the selling-price. The rest is reserved in a fund to soften the consequences of a fall of this price. They claim that the

<sup>1</sup> See H. Tyszinski, 'Economics of the Wheat Agreement', *Economica*, February 1949 and the *F.A.O. Commodity Policy Studies* Nos. 1, 2 and 4 on Sugar, Wheat and the Long Term Contract.

<sup>2</sup> See Bauer and Paish, 'The reduction of fluctuations in the incomes of primary producers' in *The Economic Journal*, December 1952.

boards' policies contain the germs of production limitation. They point to the fact that the small producer only gets a part of the selling price in cash. A considerable export duty is raised on his product. In their study they drew up a formula containing (1) the price received by the producer, (2) the market price in the past (net yield per ton), (3) the market price expected in future, (4) the size of the harvest, (5) the size of the future harvest, (6) that part of the expected yield to be paid out in the current year, and (7) the number of years over which the average price is calculated. If the number of years is set at 1 and the part of the yield paid out in cash is set at  $\frac{1}{2}$ , the farmer's total cash receipts will comprise half the value of the current year's harvest plus half the value of the previous year's harvest. Half of the current year's crop yield is paid for in 1 year promissory notes in order to reduce an immediate danger of inflation in case of a quick rise in prices.

The above mentioned discussion is an example of the intricate problems of commerce. Each tropical commodity has its own problems and its own market, characterized by specific requirements for quality, delivery, payment etc. In one of the next chapters one will find some information about the coffee-trade and the cocoa-trade with respect to marketing problems.

It is clear that the commercial aspect of rural development planning should not be overlooked. It might be relatively easy to bring an area of newly reclaimed land into production. But once the moment of marketing of the new product has arrived, unexpected difficulties might arise. Those who are in charge of the development project should try to know as much as possible about the habits and traditions in

the specific trade of the product. It is not easy to sell a new product. Commerce is largely based on confidence. Once the new seller has gained confidence by fulfilling his obligations in each respect, expansion of the trade might be relatively easy. A loss of confidence is a sad and costly affair.



## *Chapter VII*

### ECONOMIC CONCENTRATION AND TROPICAL DEVELOPMENT

**W**e shall now examine in brief how economically the two types of country – the more-developed and the under-developed country – differ. For many decades the mentality of the more-developed country was capitalistic. Profit-making in the sense of obtaining spendable income was regarded as the essential aim. But later on concessions were made after profits had attained a certain level – after the first hunger had been appeased. These concessions allowed for other forms of production such as co-operatives. Another representative feature in the organization of the more-developed economy is the rise of the firm. The firm – especially the industrial firm – is the power-generating unit par excellence to ensure the flow of goods and money into a national economy. The activity of the firm probably dictates for a good deal a government's economic policy. In fact the government needs the firm, especially the industrial firm but the firm can often manage without the government. The firm has a dynamic power whereby development proceeds without governmental intervention or governmental initiative being required.

Finally comes the association or group within the firm bringing employer, staff and workers together. These groups have both social and economic objectives; without the latter they cannot exist. One of the objectives might be profit-sharing for the workers. A certain financial strength of the firm is essential for such an objective.

The task of the authorities in developing a tropical country is much more difficult. The dynamic drive of the more-developed countries is lacking. The firm and the groups in the firm referred to above rarely are of sufficient importance to initiate policies of their own. The organizing power of the firm is missing.

Development policy in the tropical zone has, as far as possible, to be copied from the more-developed country with which the closest relations were maintained. But the material poverty in the tropics inhibits the communal spirit. Think of the trifling amount of fighting funds of the tropical trade unions. Resistance will also occur with respect to participation in co-operatives.

In the organization of a tropical economy the question of capital and its ownership plays a major role. As a rule, the labour factor and the land factor do not give rise to heavy complications as far as organization is concerned. Capital, however, is often in foreign hands. Now we use the word capital not in the sense of capital stock (machinery) but in the sense of capital investment (shares). Sometimes concentrations of economic power arise which dominate a large section of economic life. The concentration of capital may affect the production process in the following ways:

1. in production itself,
2. in distribution and transportation at home and abroad,
3. in marketing at home and abroad.

As the concentration of capital is intensified, attempts may be made to encompass the entire process – from initial production up to and including the sale to the consumer. In general the degree of concentration in a certain sector will

depend on the dynamic force and the financial strength of the different firms in that sector.

In theory the final result of this struggle will be a situation of monopoly in which one firm will dictate the price of the product. Such a situation, for instance a bread monopoly, can be very dangerous. Government action to combat this problem deserves our particular attention, for such concentration has a very great influence upon the economic life of the under-developed country. However, this monopolistic influence can rarely be measured because data about the degree of concentration and monopoly are lacking.

Consequently, the problems of practical policy must be approached with great caution. Here, in fact, social and political considerations might well obscure the economic assessment. This is especially the case when judging the social-economic importance of foreign enterprise in an under-developed country. Currently, public opinion in tropical countries is inclined to be hostile to the establishment or expansion of foreign enterprises. Political and social considerations influence such opinion. People are often criticising the overt or disguised transfer of profits from the under-developed to the more-developed country.

That such transfers of profits do take place and that they are considerable in proportion to the invested capital is highly probable, although figures are lacking. Examples include the estate agriculture of Indonesia, the bauxite extraction of Surinam, the timber fellings of British Honduras, the oil wells in the Middle East, the uranium mining in the Belgian Congo, the sugar cultivation in the West Indies etc. The transfer of profits during a period say of ten years often greatly exceeds the originally invested capital. It is to be regretted that such transfers are not re-invested locally

in those sectors of the tropical economy which are still unexploited. But the fact is that private capitalists are only willing to invest when there is a sound possibility of securing greater rewards for greater risks. They nearly always wish to transfer a substantial proportion of their profits. It may be noted that more often than not the capitalist furnishes not only the money but also the management of the enterprise as well as the necessary technical know-how.

Elsewhere we referred in more detail to the advantages which occur to big firms. Here we confine ourselves merely to pointing out the relatively high investment cost per labourer employed in up to date processing plants. They are examples of the so-called 'capital-intensive' techniques. In view of the financial risks which are inherent to the manufacture of such products, the tendency to try to concentrate all economic power is understandable. In the past, this tendency was far less resisted in tropical countries than in more-developed countries.

As an example of concentration in a tropical economy, mention must be made of the growth of the Handels Vereniging Amsterdam (Amsterdam Trading Company).<sup>1</sup>

This company was established at the end of the 19th century with the exclusive object of trading in colonial products in the Dutch East Indies. One of the reasons for this was probably the fact that the financial organization of the company did not allow for long term credits to be obtained. Estate companies were not to be purchased, nor was participation in enterprises of this nature contemplated.

However, the suspension of payment by certain debtors made it necessary for the company to participate in produc-

<sup>1</sup> *Annual Reports of the Handels Vereniging Amsterdam.*

tion enterprises and to obtain long term credits for that purpose. This started in 1890 with a sugar enterprise which became 7/8ths the property of the trading company. This was followed a few years later by the purchase of other plants. Then came a period of expansion during which the company deliberately deviated from its original charter and largely invested in productive enterprises and also incorporated small local producers into its estate companies. The trading firm was liquidated in order to concentrate fully on such exploitations.

Fifty years after its establishment the company owned a total of 36 enterprises. In Java it had 15 sugar factories, 4 tapioca companies, 3 of which were simultaneously producing fibres and 2 rubber estates, one of which was combined with coffee production. In Sumatra it owned 5 tea estates, 4 fibre enterprises, 4 rubber estates and 2 oil mills. The paid-up capital which amounted to 1.2 million Dutch guilders in the first year, had increased to 60 million Dutch guilders in the 62nd year. Expansion continued till after the Second World War. Including its sugar factory in Ethiopia, 90,000 tons of sugar, 24,000 tons of fibre, 39,000 tons of palm oil products and 11,000 tons of tea were produced in the course of 1955. The labour force totalled 1,000 Europeans and 150,000 local workers.

For processing the purchase of products of domestic agriculture as a supplement to products of own estates is sometimes required in order to attain a full utilization of capacity. An industrial processing plant requires its raw materials to be in steady supply and to be of standard quality. It is also desirable that the production area is as concentrated as possible so that transport cost are not prohibitive. As the process becomes more complicated and thus the

proportion of fixed cost – which do not vary with the volume of production – to overall cost increases, these requirements as to supplies are even more necessary. All this will evoke a tendency to concentration of economic power.

The H.V.A. Company's contribution to the national income and the balance of payments per unit of invested capital and per labourer employed has undoubtedly been considerably larger than would have been the contribution of equivalent amounts of capital and quantities of labour employed by small local producers, even allowing for profits transmitted abroad by the Company. And this may be stated even without considering the indirect benefits for the regional and national economy by the considerable expenditure of wages.

While the necessity – being in a competitive market – of reducing its operating cost by all possible means was an important cause of the monopolistic tendencies of the above-mentioned Indonesian company, the following story of economic concentration is somewhat different. The largest concentration in banana production and trade is the United Fruit Company, which has its head office in Boston. It was created in 1899 by a merger of the Boston Fruit Company and the Minor Keith concern. Since 1910 the British firm of Elders and Fyffes also forms part of it.

The crux of the United Fruit Company's policy lies in its control of transport facilities, through the possession of railways and ports, and its control of banana shipping. This monopolistic position is made possible because the small Central American republics where it operates were in the first decades of this century politically weak. The United Fruit Company dominates the production and marketing of

bananas. In the years immediately preceding the Second World War, approximately 50 per cent. of the world banana export trade was in the hands of the company. In 1937, its share in world exports of bananas is said to have been 45.3 %; 52.7 % in imports into the United States and 47.5 % in imports into Europe.<sup>1</sup>

It would be wrong to speak of the United Fruit Company as a concern concentrating exclusively on banana culture. Although bananas constitute a large part of its production – 1.2 to 1.4 million tons are exported annually – yet it also produces, among other things, cocoa, sugar and palm oil. Of a total acreage under cultivation of nearly 250,000 ha. (625,000 acres), banana culture covers only one-fourth. The cane-sugar acreage is almost as extensive, covering 40,000 ha. (100,000 acres) in Cuba alone. The company has extended its interests over nine countries, namely Panama, Costa Rica, Honduras, Guatemala, Columbia, Ecuador, Cuba, Jamaica and Santo Domingo. It employs a total of 100,000 workers. Foreign enterprises in the tropical zone are often attacked because wages paid to workers would be too low. However, in comparing the wages paid by the United Fruit Company to the average incomes derived from family enterprises in the countries concerned, it is found that the wages of the United Fruit Company are substantially higher.<sup>2</sup> Furthermore, order and discipline prevail on the plantations and as medical hygiene and social care are provided, they often form the bright spots of a tropical country.

Through the reclamation of largely virgin territories, such

<sup>1</sup> See Baatz, *Die Bananenwirtschaft ausserhalb der U.F.C.*, Hamburg, 1941.

<sup>2</sup> See K. M. Stahl, *The Metropolitan Organization of British Colonial Trade*, London, 1950, page 49 and following.

areas are freed of malaria and yellow fever. Upon the initiative of the United Fruit Company, systematic social work was undertaken in Jamaica as far back as 1937.<sup>1</sup> Their railway net covers approximately 2,500 km. (1,500 miles), of which 600 km. (360 miles) are in Cuba and 500 km. (300 miles) are in Costa Rica. It is estimated that – at 1955 values – investments reached a sum of US \$ 400 million. Normally net profits probably amount to more than US \$ 60 million per annum.

It is practically certain that the monopolistic position is exploited for all it is worth. While on the one hand the activities of this enterprise are beneficial to the countries in which it operates, on the other hand the view held by the local authorities that a considerable part of its net profits should be re-invested in the tropical country, is readily understandable.

It is apparent that a statement that such concentrations exercise unfavourable influence upon the economic life of an under-developed country, should not be made without a thorough examination of the facts. It is important, in the first place, to know the exact real contribution made by such enterprises to the national income, to the balance of payments and to the government budget. Then investigation should be made as to the amount of profits so that further contributions can be made to the national economy for instance by imposing progressive taxes on revenues but without 'killing the goose that lays the golden egg'. Repression or expropriation by the State of such enterprises would normally be unwise. It is beyond dispute that the original

<sup>1</sup> See T. S. Simey, *Welfare and Planning in the West Indies*, Oxford, 1946, page 204.



investments have often made a considerable contribution to the prosperity of the various countries. From an economic point of view one can denounce as definitely wrong most of the resistance against foreign interests which prevails at present in many tropical countries. The objective of the government concerned should be not to eliminate these interests but rather to channel foreign investments into the most desirable sectors and, if necessary, to exercise a certain control on the transfer of profits. The government should bear in mind that the best guarantees against capital flight and excessive transfer of profits are a stable government and a sound economic policy.

## Chapter VIII

### MARKETING RESEARCH FOR TROPICAL PRODUCTS

If an attempt is made to accelerate agricultural development, an estimate should simultaneously be made of the potential markets that exist for the anticipated products. For the tropical country the examination of export possibilities is usually of more importance than the examination of future markets in the home country. The low purchasing power prevailing in the country itself plays a role. Nevertheless, projects of which a minimum quantity can be sold with certainty in the home country deserve preference.

In the following we shall confine ourselves to an examination of the markets for two or three agricultural commodities bearing in mind that the relations existing between the size of the project and the possibilities for marketing are functional. In order to be a success a project must ensure that the cost price of the product is as low as possible. The bigger the size of the project the lower will normally be the cost price. On the other hand, the market price of the product can be decisive for the size of the project. From the contents of many planning reports it does not appear that the existence of this mutual relation between the size of the enterprise and the market price is always fully realized.

#### *1. The relation between the size of an enterprise and the marketing scope*

Our first example of marketing research concerns the afore-mentioned connection between the size of an enterprise

and the marketing scope. Let us consider the Wageningen project of the Foundation for the Development of Mechanical Agriculture in Surinam. This is an excellent example of the increase of labour productivity in tropical agriculture. After the land has been reclaimed by polder drainage, the rice is cultivated, harvested and processed according to a consistent, mechanical method. In considering the future scale of the project the management was left the choice between 64, 98, 140 or 210 farms of 72 ha (180 acres) each.<sup>1</sup>

The problem was approached in the following manner.

In the first place a calculation was made of the investments needed for each holding. These were divided respectively into cost which were independent or dependent of the size of the holding. We might also speak of fixed and variable cost. The share of fixed cost, i.e. the cost which do not vary with the volume of production, proved to be low, as is shown in table 12.

TABLE 12. Investments for mechanical rice cultivation per farm (in Dutch f 1,000)

Number of 180-acre farms	64	98	140	210
Dependent cost . . . . .	374	302	268	230
Independent cost . . . . .	87	87	87	87
Total per farm . . . . .	461	389	355	317

Next the cost of operation and the yields per farm came under review. The market-price of the rice was set at the low pre-Korean war level of Dutch f 475.— per ton c.i.f. Amsterdam. On the assumption of a specific price level and a specific yield per acre, it became possible to calculate the gross surplus per farm, excluding wages.

<sup>1</sup> The following was taken in its entirety from a treatise by Prof. Dr. P. J. Verdoorn of The Hague, Holland.

TABLE 13. Gross profit per farm (in Dutch f 1,000)

Number of farms	64	98	140	210
Gross turnover . . . . .	84	84	84	84
Cost of operation . . . . .	70.8	64.6	61.7	57.5
Gross surplus (pre-Korean price = 100) . . . . .	13.2	19.4	22.3	26.5

Only one or two workers per farm of 70 hectares are involved due to the heavy mechanization.

An important item in the calculations concerned the risk with respect to fluctuations in the future price. To this effect a survey was drawn up of the movements of rice and soya prices over the years 1921 to 1939. At first soya was included in the production plan as second crop, but this was subsequently dropped. From this series the standard deviations for the period in question were calculated. A standard deviation of 10 for a price = 100 means a possible price ranging from  $100 - 10$  to  $100 + 10$ . For Burma rice they amounted to 31 and for soya to 27, both London quotation. In post-war years several attempts were made at international level to attain a greater stability of prices. It was therefore assumed in the analysis in question that considerably smaller deviations – of 15 for example – were to be expected in future. In this way it was possible to estimate the variations of the gross surplusses per farm (see table 14, page 99).

Finally, a minimum required gross income per farmer was determined at Dutch f 16,000. At this level it would be possible to recruit young competent farmers. By incorporating the latter sum into the above table, it thus becomes apparent that only the execution of a project comprising 210 farms, or 15,000 ha. (37,500 acres) offers sufficient

TABLE 14. Gross surplus in Dutch f 1,000 per farm at various prices (pre-Korean price = 100)

Deviation in % of pre-Korean war price level	Number of farms			
	64	98	140	210
+ 15	27.8	34.0	36.9	41.1
+ 10	22.9	29.1	32.0	36.2
+ 5	18.1	24.3	27.2	31.4
0	13.2	19.4	22.3	26.5 <sup>1</sup>
- 5	8.3	14.5	17.4	21.6
- 10	3.5	9.7	12.6	16.8
- 15	1.4	4.8	7.7	11.9

<sup>1</sup> Cf. Gross surplus in table 13.

guarantee that this minimum will be attained. A deviation of the price of rice of - 10 still gives a gross surplus per farm of f 16,800 guilders which is f 800 more than the minimum required gross income per farmer of f 16,000.

## 2. *A market analysis for coffee*

The customary procedure for analysing the market with regard to staple products begins with an estimate of future demand. This is determined by taking into consideration the growth of the population, the increase in the number of consumers, the trend of the national income per capita, the purchasing power of the consumer, the influence to be expected from substitutes, and the consumption habits. A wider insight is gained into the situation by calculating, if feasible, such distinctive features as the change in demand due to a change in income or price. The more the demand comes from a more-developed country, the more reliable are the estimates with respect to the population trend, the national income, etc. The future supply of the commodity

is approximated by the study of technical and agricultural publications and by the evaluation of the plants and trees expected to be in production in 10 or 20 years. If production is concentrated in a few well-known areas, more value can be attached to such estimates. An estimate of world plantings of perennial cultures will show a smaller margin of error than an estimate of annual plantings – e.g. cassava and rice. Moreover, the first mentioned crops are cultivated chiefly in estate agriculture, with the result that better data may well be available.

The research work carried out by the Netherlands Economic Institute of Rotterdam with respect to the marketing potentialities of coffee on the world market may serve as an example of a market analysis for a tropical product. This analysis was based, in part, on the work of the United States economist Staehle, who investigated towards the middle of 1946 how coffee prices would go after the post-war period of shortage came to an end. Staehle did not concentrate his price prognosis in one single figure, but put up a number of plausible border-line cases. The variable factors, which because of their unsteadiness would bear much weight, were also set forth.

The above mentioned report of the Netherlands Economic Institute first lists a number of agricultural data. Next the production of coffee comes under review, whereby the very inelastic short-term supply of coffee and the predominance of fixed cost in the over-all cost is pointed out. This is followed by an estimate of the number of coffee bushes (estimated at nearly 5 milliard for the whole world in 1947), and of the production suitable for exportation. Production is measured in bags weighing 60 kg. (approximately 132 lbs.) each. The production is divided into

geographical areas; it is apparent from this that Latin America takes a first place with 85% of the world total and that Brazil, with 64% of the world total, has a predominant position among the Latin American countries.

Furthermore, it was evident from the report that there has been a considerable fall in the world coffee production since the Second World War. It was found, upon closer investigation, that the principal cause for this decline was the downward trend of the Brazilian production. This diminishing yield was greatly influenced by the fact that production went on in Brazil without the fertility of the soil being properly maintained. The industrialization of Brazil has made labour required for maintenance, plucking and extension of coffee culture expensive. This, in turn, threatens the markets for Brazilian coffee which is based upon a production method of comparatively few trees per hectare, resulting in a low cost price combined with a reasonable quality. In 1938, the cost price of a bag of coffee amounted to 88 cruzeiros; in 1950 it had increased to 545 cruzeiros. It goes without saying that inflationary forces played a certain role.

In the family enterprises of Columbia, the second largest coffee country, production is more intensive. It is probable that Columbian production and sales will increase. As far as the other continents are concerned, the rapid development of Africa as a producer (17% of the world total in 1956) as well as the slow recovery of Asia, including Indonesia, are worth noting. In view of their large domestic consumption the exports of these latter countries are relatively small.

Separate attention is paid to the volume of exports and to economic policy. The economic policy is dominated by the

principal importer i.e. the United States of America. Brazil, after restricting supplies, set a minimum export price which, in 1954, was followed by a devaluation of the Brazilian currency.

The future will show to what extent other factors will affect the supply. In estimating exports, it must be remembered that coffee is easily conservable so that there is generally a surplus carried over from the previous production year. In Brazil, this surplus amounted to 6 million bales in 1952.

The United States of America absorbs 65% of the world coffee exports, followed by Europe which buys up 26%. In consequence, New York is the world market for coffee. Price fluctuations there determine the trend of coffee prices throughout the world. Brazil is the most important supplier of the New York market followed by Columbia. In Europe usually only the Brazilian product is sold.

Before we proceed further with an examination of consumption, we point to the logic in the above investigation. First the past and the present of production, consumption and prices are discussed, next follows the discussion of the future both of production and consumption as well as of prices. Determinative elements are gradually revealed in proportion to their importance. It is already clear that the future trends of export volumes and export prices of Brazil and Columbia and also the trend of economic life in the United States of America and Europe are of prime importance.

The volume of coffee consumption is influenced by:

1. The increase of population, i.e. the number of potential consumers.



2. The consumption habits and preferences, and the consumption of other beverages.
3. The size of the real family income; the purchasing power of the consumers.
4. The price of coffee in proportion to the prices of substitutes.
5. Milk and sugar prices. There is some connection between the demand for coffee and the demand for milk and sugar.

Each of the principal consumer countries is examined in turn. It is pointed out that between 1936 and 1946 there was an increase in annual consumption per capita in the United States of 2.9 kg. (approximately 6.4 lbs.). Reference is made to Staehle's analysis which showed that this increase was due to three principal causes, namely:

increase in real income . . . . .	1.7 kg. per capita
relative price reduction of coffee with	
respect to foodstuffs in general . . .	0.5 kg. per capita
greater preference for coffee . . . . .	0.7 kg. per capita

---

Total 2.9 kg. per capita

Staehle considers the influence of price changes on demand to be slight; in other words, the demand elasticity of coffee in the United States of America is small ( $-0.24$ ). A rise in coffee prices of 100%, only involves a decrease in consumption of 24%. During the last 40 years the consumption per capita has doubled in the United States and this trend continues. The main reason for the rise in consumption per capita is the increase of real income, particularly during and after the Second World War. Staehle estimates the income elasticity for the United States at

0.43. A rise in income of 100% involves a rise in demand of 43%.

With regard to the consumption of coffee in Europe, the slow recovery following the drop during the Second World War is pointed out. Here the impact of substitutes such as tea (United Kingdom) and beer (Belgium) are of significance. After the Second World War there was a strong increase in sales in Europe of cheap African coffees. In the United States the sale of Brazilian brands (strong) fell off, whereas the sale of brands from Columbia and other countries (mild) showed an increase compared with the years before 1940/1945.

Regarding the price trend of coffee on the world market, it is pointed out that in the 'thirties' production restrictions were enforced in Brazil which, after 1945, contributed to the high coffee prices. On the other hand, as mentioned earlier, the import needs rose all the time, particularly in the United States. The price increase in the latter country, accelerated by the Korean war boom, continued until 1951 when an official price ceiling was enforced. A clear picture of the trend of the coffee price is obtained by comparing it with the wholesale price index for foodstuffs.

With respect to the future supplies, an increasing influence of the new plantings can be counted on. However, domestic consumption in the producing countries also shows an upward tendency. In consequence, production for export will increase less than the total production. Reference was made earlier to the decline in production in Brazil. As far as future world supplies are concerned, the following may be stated.

1. Brazil: The planting scheme, covering the years 1920-1930, ran parallel with the one covering the years 1945-

1960, now in operation. It is therefore assumed that the productivity per plant will remain at a level of 600 kg. (1,320 lbs.) per 1,000 coffee shrubs a year. Due to the reasons afore mentioned, however, the number of plants in production will probably drop from 2 milliard in 1949 to 1.5 milliard in 1960. The production in 1960 can thus be set at 15 million bags.

2. The trend in the production of mild varieties indicates that a production of 12 million bales can be expected for the year 1960.
3. In Africa a 40% increase is expected in the period 1949-1960. Production will reach 6 million bales by 1960.

As regards future demand the development of real income is considered of prime importance. In fact, changes in consumption only take place under the influence of modifications of real income, while prices exercise relatively little influence. Consider both the coefficients of elasticity. For the United States of America the lines sketched by Staehle are extended, so that an estimate of the increase in the real income per capita and of the greater preference for coffee is obtained. Next, use is made of the corrected estimates supplied by Collin Clark on the trend of the real income per capita to be expected in the principal countries of Europe. In Great Britain, for instance, with an increase over 1949-1960 of the real income per capita from 111 to 125, a growth of population from 106 to 108 and an income elasticity of 1.42, consumption of coffee in 1960 will have increased by

$$\left( \frac{125 \times 108}{111 \times 106} - 1 \right) \times 100 \times 1.42 = 21\%$$

and will therefore amount to  $1.21 \times 0.7$  million (1949)

= 0.84 million bales. Summarizing, the world market picture at 1949 prices in 1960 will be:

TABLE 15. Market picture of coffee per 1,000 bales in 1960

	Supply	Demand	Demand-Supply	Demand-Supply in % of the supply
1960	33,000	39,000	6,000	18%

Roughly estimating the world elasticity of demand at 0.3, the increase in prices in 1960 in respect to 1949 prices can be roughly calculated at:

$$\frac{18}{0.3} = 60\%$$

It can therefore be concluded that in 1960 the situation on the world market will be favourable for the producer. The reader will understand that the actual figures are not of paramount importance for the purposes of this book. The report has been examined here to show how marketing research for tropical products is done.

### 3. *Price fluctuations in the cocoa market*

A third example of marketing research for tropical products concerns a study of the present-day cocoa market and its perspectives. This study was made by the Commission for the Overseas Territories of the O.E.E.C. and is dated November 1955. Its purpose was to investigate the potentialities of further exports while attention was paid simultaneously to short-term price fluctuations. With regard to the latter, particularly the events which took place in the years 1953/1954 were submitted to a close scrutiny. From the middle of 1953 until the middle of 1954 the price of

cocoa successively doubled only to fall again to its point of departure of the middle of 1953. One of the main points of the investigation was whether the co-operative marketing organizations of the Gold Coast and Nigeria had played a decisive role in this temporary boom, of which a short analysis is now given.

First of all it was established that considerable price fluctuations of cocoa occurred both before and after the Second World War. The price changes from day to day and from hour to hour. The two big markets, i.e. New York and London, react fairly closely to one another's quotations. In the short run the supply does not react swiftly to price increases. It is the economic function of the world cocoa market to give a price whereby the demand is brought to the level of the available supply.

A price level is difficult to determine. The total cocoa supply fluctuates – sometimes by as much as twenty per cent. – from one production year to another. To forecast the future supply is not a simple matter. Nevertheless, with the aid of questionnaires as to the extent and age of plantings, the Food and Agricultural Organization of the United Nations makes inquiries regarding future production which yield results that are satisfactory.<sup>1</sup> However, cocoa is a seasonal product and manufacturers of chocolate therefore buy up large quantities of 'futures' without knowledge of what the total supply in the new season will be. This is done to safeguard their production.

Thus the next factor of consequence in an analysis of the 1953/1954 boom is the presence of both a 'spot' or 'cash' and a 'futures' market. The latter is a speculative market,

<sup>1</sup> *Cocoa, A Review of Current Trends in Production, Price and Consumption*, Rome, November 1955.

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the turnover of which is generally considerably larger than that of the former. The sales organizations of the Gold Coast and Nigeria dominate 50 per cent. of the supply. As noted above the chocolate factories play an important role in the demand. A very close co-operation exists between the two sales organizations of the Gold Coast and Nigeria.

In surveying the total actual market for cocoa it is thus found that there are a number of aspects of demand and supply which make free competition often fairly remote. For free competition supposes a large number of small buyers and small sellers. Yet to some extent the brokers and traders can affect prices by trading in futures, especially on behalf of small manufacturers. Thus the number of participants to the market is fortunately some what enlarged.

Next the conduct of the African sales organizations deserves some attention. The key point of their sales policy is the fact that sales are always spread over the whole year. Their price policy is linked to their sales policy. This spread, which prevents too great quantities being offered at particular seasons, involves a regular contact with the market. In fact this occurs every day. It is apparent from a survey of the sales of these organizations during the boom period that from October 1953 until April 1954 they were normally never out of the market for longer than a week.

Despite certain monopolistic tendencies actual market prices fluctuate fairly widely. This is true also for coffee. From January 11 until January 20, 1955 – when the boom period already belonged to the past – the price of the Gold Coast Marketing Company amounted to £ 415, £ 452 and £ 400 per ton, respectively. For the years 1931–1955, the percentage differences in prices between two successive months were calculated. Attention was also given to the

daily fluctuations within the monthly trend and it became apparent that such fluctuations before the war were of the same character as those after the war, that is to say, after the co-operative African sales organizations began operations.

If, following these preliminary remarks, one examines the actual course of prices in the years 1953/1954, several causes, partly connected with the market structure described above, prove to be responsible for the abnormalities. In the first place the marketers were inadequately informed as to the true situation. In October 1953 a general economic recession was prophesied. The forthcoming crop of the Gold Coast was over-evaluated by 30,000 tons. As early as 1952 buyers had embarked upon a cautious policy as to stocks, partly because of financial problems. In the second place two governmental measures came into force. The first concerned the abolishing of war-time rationing of chocolate in the United Kingdom and the second the strong governmental support given to exportation of chocolate products – not cocoa – in Brazil. In the third place, the futures market had been adjusted to allow for a decline during this period of susceptibility. It is said that in consequence many cocoa brokers nearly went bankrupt.

The price, in July 1953 which was around £ 250 per ton (London quotation), had increased to £ 300 per ton in November of that year. On December 21 of the same year the revised crop estimate of the Department of Agriculture of the Gold Coast was published, which was lower by 30,000 tons. Subsequently a period lasting a few months occurred during which, owing to heavy speculation on the futures market, the price on the spots market was also

influenced. The manufacturers grew scared for their raw materials supplies. It was in May 1954 that the quotation reached its peak at £ 515, following which, as a result of resistance in the demand, the price dropped once again to the mid-1953 level.

This example of marketing research proves the importance of obtaining adequate information. Indeed, much of the price increase should be blamed on the lack of sufficient insight. The already high initial level also exercised its influence, with the result that the buyers – who are often manufacturers at the same time – were nervous about having sufficient stocks. Finally, speculation had its customary accelerating effect on the market mechanism.



## *Chapter IX*

### SCOPE FOR A SOCIAL POLICY

**I**n tropical countries the field of labour relations is dominated by the great lack of technical skill and the low labour productivity. Here a functional relationship is involved. For, as experience has shown, greater skill and greater productivity may lead to better relations, while better relations may increase the willingness to participate in the production process.

Improvement of working conditions will increase productivity. In the majority of tropical areas these conditions are far from favourable. In many cases the relationship employer-employee has been characterized throughout the centuries by the employee's low and dependent status. The caste system in India, the penal sanctions in the Sumatra cultures and the slavery in the West Indies are examples.

In this connection, Boeke – a Dutch economist – has pointed to the effect of the penetration of monetary exchange – at the turn of the century – on an Indonesian village that until then had been functioning on a barter economy. From then on there was a constant scarcity of money. Practically all economic power came into the hands of the employers. Despite their poverty there was no secret formation of unions by employees. Labourers were forbidden by law to unite, a prohibition which prevailed everywhere in Asia and lasted until the Second World War. It was not until after that war that a turning-point was reached in the social policy of the principal tropical

areas.<sup>1</sup> Undoubtedly the severance of political relations with the former colonial powers had much to do with this.

While the main objective of pre-war social legislation in tropical countries was always providing foreign capitalists with the necessary manpower, an opposite direction was often taken after 1945. The material welfare of labourers in agriculture was safeguarded by a ban on dismissing workers and by the determination of working-hours and the fixation of a minimum wage. The establishment of workers' unions was encouraged while, in cases where government arbitrated in conflicts arising between employers and employees' unions, the former were rarely supported. Frequently the new social legislation was based on existing European legislation. Practically everywhere the legislation restricts the employer's authority by requiring minimal employment conditions, including measures on safety and on accident and sickness insurance.

Labour rules, which are currently acknowledged and respected in European countries, have been modified in those European countries enormously since the Communist Manifesto in 1848 appeared and since the first objections to child and female labour were voiced in the 19th century press. It takes a long time before conceptions such as the labourers' right to work and to adequate remuneration and such as the right of the employer to prevent wages from rising to a level, prohibitive for marketing, are generally accepted by employers as well as by employees. That these conceptions are now taken as a matter of course in Europe is primarily due to the increasing national prosperity which ran parallel with the evolution of social demands.

<sup>1</sup> See Stillman, *Africa in the Modern World*, Chicago, 1955.

As stated earlier, the social legislation of the tropical area was often copied from existing European legislation.<sup>1</sup> However, it is not national prosperity but national poverty which is the background in most tropical countries.

The present high level of national prosperity in Europe is the result of the dynamic development following the industrial revolution. Whereby – especially in the initial stages – the entrepreneurs of the 19th century had cheap labour forces at their disposal. This enabled the basis to be laid for an expanding industrial system. The reaction against the exploitation and poverty of workers prevailing in those times can be regarded as the first phase towards achieving the present high standards of social justice.

It is certain, however that the tropical labourer will not submit to a similar exploitation. Now if a favourable economic situation in the tropical country arose attracting risk capital from abroad, a production process could be started leading almost immediately to national prosperity. Social legislation to protect the worker would quickly follow. But the favourable conditions for economic development in the Europe of the 19th century when workers let themselves be exploited cannot now be counted on for the tropics. The tropical worker will think more of himself and his conditions of employment than of his contribution to the economic development of his country. As we wrote in the first chapter, he is dissatisfied with the present situation, he wants more out of life. Trade unions practically everywhere in the tropics are still in the initial stage both with regard to organization methods and to financial resources. The fighting funds, which in certain European countries make

<sup>1</sup> See the various publications of the International Labour Office of Geneva, such as, *Labour policies in the West Indies*, Geneva, 1952.

the trade union an investment fund, are yet small. Sometimes the organizers, notably in South American countries, assume the attitudes of the labour bosses in the United States yet without obtaining similar successes in ameliorating labour conditions. Neither does the political atmosphere lend itself to serious negotiations between parties, such as those which take place in Western Europe. The strike is the weapon most frequently used.

In general, the position of the trade union in tropical countries is vulnerable in many respects. One simple reason is because the financial contributions laboriously collected from members are sometimes used dishonestly by less scrupulous leaders. But a most important reason is because of too close ties which exist between the workers organizations and the political parties. A union is regarded as a block of votes for the party rather than as an independent organism. This is a situation which has always been avoided as much as possible in Western Europe.

The government thus no longer functions exclusively as administration and as court of appeal. Its social policy can be deflected for political purposes to the neglect of economic interests. In the various tropical areas little care is often devoted both to labour mediation and to labour registration. In some instances, for that matter, employers actually display more understanding of the social needs of the employees than do the employees themselves.

It may be useful to give a short description of the international organization responsible – especially after the Second World War – for dealing with labour relations in tropical areas. We refer to the International Labour Office which has its seat at Geneva. This office, which is provided with

funds by member countries, aims to make the conception of social justice valid in all countries. To this end data are collected on labour relations and social legislation. After study of these data minimum labour conditions are recommended and a close watch is kept on the realization of the various recommendations.

In addition to an office for current activities, the organization comprises a board of management composed of government officials and representatives of employer and employee groups. The participating countries can send their representatives annually to the International Labour Conference whose work results in resolutions and recommendations customary to such conferences. Consultations on formulation and validation take place at the meetings. A two-thirds majority of votes is required for international validation.

Since operations commenced in 1919, some hundred resolutions and an equal number of recommendations have been approved, relating, *inter alia*, to working-hours, holiday wages, female and child labour, security measures, unemployment, accident sickness and life insurance, etc. It was from these deliberations that the International Labour Code, first published in 1941, was developed.

As to the activities of the International Labour Office concerning tropical agriculture, a few remarks regarding its efforts on behalf of plantation labour will suffice. A Regional Asiatic Labour Conference was held in New Delhi in 1947, where problems of plantation labour in Asia were discussed for the first time region by region. One of the resolutions approved by this conference held that the living and working conditions of plantation labourers were unsatisfactory.

It was urged that the various governments should take legal measures and that a more detailed study of the problem be made. This resulted in the institution of a Commission for Plantation Labour which drew up a number of resolutions at its first meeting, held in Bandung in 1950.

It was determined that wages should be sufficient to guarantee the employee and his family a decent subsistence and that they should be calculated in such a way that six days' wages would be adequate for seven days' subsistence. Employees living on plantations should be ensured of a minimum wage for 24 days a month throughout the year. This latter recommendation, which was unanimously rejected by the delegation of employers, gives expression to the contrast existing between economic possibilities and social requirements.

Looking at it from the employee's point of view, the desire for social security is understandable. We need not go into this further. But if it is realized that numerous sugar plantations in the West Indies are scarcely able to provide 12 days' work a month on average for resident plantation workers it will be clear that if the Commission's resolutions were applied, they might well result in a large increase in the wage cost of many products.

Now it may be true that substantial profits are continually being made in the sugar industry. And it is possible that even if employees' wishes were realized, receipts of the industry might still exceed expenditure. Yet it is equally probable that – as soon as better investment possibilities presented themselves – foreign capitalists would lose all interest in the sugar industry and switch as soon as possible to other investment possibilities. It is apparent that tropical countries because of their financial dependence on more-developed

countries, will be unable to implement in a short time such a resolution of the Commission.

As to the trade unions, the plenary session of the Commission for Plantation Labour at Bandung accepted a resolution that plantation labourers should be encouraged to organize themselves in free and independent trade unions and that employers should give these organizations as much support as possible. In 1953, the Commission held another conference at Havana and approved supplementary resolutions, including some resolutions relating to wage settlements. One of these proposed that wages should be graded in accordance with the nature of the work performed. Option to choose between hourly wages and piecework-rates was regarded as highly desirable as output might thus be increased.

Naturally, the unfavourable influences of fluctuations in market prices of agricultural products upon the workers' standard of living – there is often a clause on labour conditions in international commodities agreements – also came up for discussion. The ever-increasing pressure to have international agreements regarding the conditions of plantation labour is readily explainable by the fact that in the field of commodities agreements little can be attained on a national level. The major problems of wage-levels and wage-stability can only be brought to a satisfactory solution on an international level.

In many tropical areas the direct intervention by the authorities as to wage-rates is meeting with considerable resistance from estate owners. Indeed, the problem of wage scales is a complicated one. It has already been observed that, as plantation products have to be sold in highly

competitive export markets, an economic labour output is of prime importance in keeping down production cost. Often the wage-policy of the authorities in the tropical zone is harmful for such a level of low cost production. Moreover because of the effects of the balance of payments the domestic price level is often influenced by economic events in other countries, and, so cannot be brought under control. As a result, a certain inflation is encountered in many tropical countries as the production level is lagging behind the price level.

Obviously, no single fact is quite so unfavourable for the prosperity of the workers as a serious disturbance of the monetary equilibrium. The authorities in some tropical countries lack the necessary power to decide whether to curb the profits of enterprises and to enforce wage increases or to keep wages deliberately low in order to attract foreign capital and in order to create a favourable investment climate.<sup>1</sup> And they keep hesitating.

With respect to the development of the trade unions, the fact that the majority of labour is unskilled gives them less influence in negotiation than if their members were skilled technicians. The social situation is affected by the economically unsatisfactory situation of unskilled labour. Economic development is thus of very great importance to the development of social policy. If the economic situation stagnates, little progress can be made with respect to those unions.

The part played by employers in the tropical zone in the establishment of labour relations must again be emphasized. It has been stated earlier that frequently more understanding is shown by the employer of the social evolution of tropical areas than is usually admitted. This fact is evident in the

<sup>1</sup> See Moore, *Industrialization and Labor*, New York, 1951.



reports of the Bandung Conference (1950) and the Havana Conference (1953) of the Commission for Plantation Labour, referred to earlier.

However, one should not lose sight of the fact that conferences of employers and employees are generally attended by the best elements of both groups. This is evident, for instance, when comparing the reports of the above-mentioned conferences with reports on actual social conditions in e.g. the sugar industry in certain tropical areas. Those reports indicate that certainly not all employers in tropical countries concern themselves very much with labour conditions.

## *Chapter X*

### CO-OPERATIVES AND TROPICAL DEVELOPMENT

**I**n the preceding chapters we told the reader about the difficult life of the small farmer in a tropical country. The single farmer, even if his family provides him with cheap labour, is apparently a weak economic subject. He lacks economic power both as a buyer of fertilizer, machinery or rural credit and as a seller of agricultural products. It is fully understandable that considerable attention is paid nowadays to rural co-operatives in tropical areas.

In general a combined effort either to buy food or to obtain credit or to sell products must lead to an improvement of the position of the individual farmer. Once more, however, we draw the attention of the reader to the fact that the human factor in tropical agriculture is a weak one. Which means that the common sense of the farmer is sometimes lacking. The small farmer who is competent and who works hard will make a good member of a co-operative society. But he is scarce.

Nevertheless the encouragement of co-operative farming has certainly improved rural conditions in quite a few tropical countries. We will discuss this subject, distinguishing between :

- a. production co-operatives
- b. consumption co-operatives
- c. credit co-operatives.

Those co-operatives which combine e.g. production and

credit co-operatives at the same time are called multi-purpose co-operatives.

Both production co-operatives and consumers' co-operatives benefit when a country's economy thrives on. This also applies to credit co-operatives as a sound economy implies a stable monetary policy. A co-operative can only flourish if its economic and financial structure is as sound as that of a private enterprise and if its management follows the principles and policies of ordinary private business. That is essential if a co-operative is to stand up to the competition of State and private enterprise.

Its commercial structure and thus its cost structure is of the greatest importance to each co-operative society and for the development of the co-operative idea. There can be hardly any distinction between co-operative and private enterprise as regards calculations of cost, whether in developed or under-developed countries.<sup>1</sup>

The component factors in any co-operative, whatever its form, may be classified as:

- a. the human factor
- b. the economic factors within the co-operative
- c. the economic factors outside the co-operative.

We shall examine more closely these three factors for each of the three major types of co-operatives (production, consumers' and credit).

For the production co-operative, the behaviour of its members – the human factor – is undoubtedly important. Usual difficulties are the irregular supply of products and the insufficient attention paid to standardizing the quality of the

<sup>1</sup> See *Le Mouvement coopératif en territoires tropicaux arriérés*, Leiden, 1953.

product to be traded. Frequently there is a lack of labour discipline and the supervision of family members and workers on the farm leaves much to be desired. Agricultural production in the tropics nearly always includes the combatting of weeds, insects and crop diseases; but equally the activities of the small farmer himself need to be controlled by the leaders of the co-operative.

As to the economic factors within the co-operative, marketing often presents difficulties. The co-operatives enter a field of trade that is very difficult to the inexperienced. There are also specific difficulties in tropical countries as, for instance, the rapid deterioration of milk and vegetables. There is often no dairy produce industry so that milk can only be sold for immediate consumption. In order to ensure quick deliveries, transportation must take place by modern vehicles. This involves high cost in a tropical country which has no automobile industry of its own. It should be remembered that most agricultural products have a large volume to a small value and thus transport may involve freight charges being a high percentage of the cost price.

Although perennial cultures such as coffee, cocoa and sugar are free from some of the above-mentioned drawbacks, they also present problems. Demand is usually for large consignments of homogeneous quality. For such products the co-operative enters the field of the world market. Its yields depend on the price ranges on the world market, which neither the co-operative nor the authorities of the country concerned can influence.

With the above crops, as with rice, the market structure often necessitates co-operative processing and treatment of the raw materials into an industrial product. In such cases the co-operative will not only have to enter the commercial

field, it will also have to act as an entrepreneur even if the treatment can be confined to a simple process such as the fermentation of cocoa or the processing of raw coffee.

Despite all their efforts, the small and often competent sugar farmers of Puerto Rico have never managed to compete successfully with the private sugar factory owners. If a production co-operative is forced to sell its raw products to private factories for processing, it will not be likely to be successful.

The economic environment of the under-developed country is rarely favourable either for the development of the co-operative idea in general, or for the production co-operative in particular. As far as the latter is concerned, one special obstacle is the low purchasing power of the urban population – where the agricultural co-operative must find its market. Transportation, as we stated already, is often inadequate, which may jeopardize the marketing of products. Technical and financial support from the government, which has proved so useful in many European countries, is often lacking in the under-developed countries. The officials which are in charge have seldom the necessary know-how. They rarely have a consistent policy – as do the more developed countries – to raise the agrarian incomes by fixing prices or by export subsidies.

Consumers' co-operatives in the tropics also have special problems. In tropical countries the cost of living is often particularly high in towns and wages lag behind price increases. For this reason, attempts to eliminate the high profits of middlemen by means of co-operative buying and distribution are generally acclaimed with enthusiasm.

Nevertheless individual consumer habits offer sometimes

an unexpected resistance. Frequently there is only a splintered demand for consumer goods, in other words, only a small turnover for each product is possible. Frequently also preference is given to nonessential import goods rather than to essential home-produced foodstuffs.

There is no certainty that the consumer will save the surplus of his money expenditure – which originated thanks to the cheaper products of the consumers' co-operative – or that he will spend it on useful goods. It is just as likely that he will give a feast that will cost him ten times as much as he has saved. Here the consumers' co-operative comes face to face with psychology. Tropical man often lives under a spiritual and material pressure, whereby the giving of a feast is necessary to him both as an outlet and for the sake of prestige.

The consumers' co-operative itself must enter the retail marketing trade. Surprisingly it does often not suffer so much from the competition of the large foreign trading concerns. But it does suffer from the small local trader. Many a young man believes that in trade he will get rich quickly and almost without effort. The result is a profusion of small retail shops which make it difficult to assess the demand and which not infrequently spoil the market.

The economic environment in which the consumers' co-operative finds itself placed may also cause a number of difficulties. The average consumer is poor: he should carefully weigh the pros and cons of each purchase. Managers of co-operatives have to reflect that on religious grounds the Hindustani eat no beef and the Moslims no pork. Some groups of Negroes in Africa and the West Indies eat no meat at all for similar reasons. Often there exists a political resistance of certain local groups against the consumers' co-operative.

In the field of rural credit, one must distinguish between the so-called supervised credit and normal credit. In the latter case, the farmer is free. In the case of supervised credit, the money obtained in order to buy fertilizer cannot be spent on other goods. The purchase will be checked.

An assessment of the human factor is one of the prerequisites for the success of the credit co-operative. For example, it must be assessed whether a borrower has a clear understanding of credit. In other words, whether he will not spend the loan which he obtained for the purchase of fertilizer and simple agricultural implements, on luxury articles. Also, whether he has the capacity – noting that he lives a life that scarcely rises above the bare minimum of subsistence – to pay interest and to amortize his long term loan.

Answers to the above questions are of course of prime importance for the success of the credit co-operative. Yet the co-operative finds itself in competition with the private moneylender who has established a traditional place for himself in the community. The operating cost of a credit co-operative are sometimes relatively high compared with those of the usurer, for the farmers' organization may be unnecessarily complex and patterned on western methods.

Nor is the economic environment in tropical countries particularly favourable for the credit co-operative. The strength of the co-operative depends on the level of agricultural incomes which, through the years, might be subject to considerable fluctuations. As a result its position is frequently unstable.

We conclude this survey with a few remarks on the multi-purpose co-operative societies currently being established in India and Indonesia, partly as a result of community

development schemes. The following notes are based on a fairly large *dessa* (village) near Bandung on the island of Java,<sup>1</sup> made after expert observation during several years.

In order to assess the importance of the co-operative in operation there, firstly the village's economic structure was classified according to the size of agricultural holdings. Half the families inhabiting the *dessa* were found to possess little property or no property whatsoever. Their homes were built on somebody else's compound. One-fourth of the families owned only the compound on which their homes stood. One-fifth of the families owned land up to a maximum of 1 ha. ( $2\frac{1}{2}$  acres). The soil of those small holdings generally was of inferior quality. The holdings were not large enough for them to make a living.

The practical results of several years of co-operation – including production, supply of seeds etc. and grants of credit etc. – can be summed up as follows:

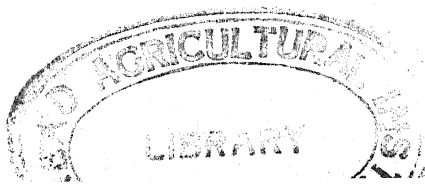
1. The benefit arising from the purchase of agricultural equipment through the co-operative accrued almost exclusively to the biggest capital investors. This group, owning more than 5 ha. (13 acres) of land, comprised approximately  $1\frac{1}{2}\%$  of the population.
2. Because of the lack of arable land, the possibility of obtaining fertilizers, pest control chemicals, seedlings and seeds for sowing, promotes the clandestine occupation of forests among those people who have no property.
3. On land currently occupied by the co-operative society – mainly large plots rented from the big landowners – the workers have remained day-labourers paid by the co-operative. The new relation with the co-operative

<sup>1</sup> See H. ten Dam, *Coöperatie gezien vanuit de dessa structuur in Desa Tjibodas, Indonesië*, April 1956.



is much more businesslike and impersonal than the former relation between master and servant. In any event, social security has not increased.

4. The co-operative's allocation of profits is such that at the end of the fiscal year the labourers receive a bonus equivalent to a week's wages as a 'sop'. The large profits go to the big landowners. If this arrangement were to be modified, capital would be withdrawn and this, in fact, would deprive the co-operative society of all authority.
5. The granting of consumption credit to farm workers who have no resources does often very little to improve their living standards.



## *Chapter XI*

### MONETARY EQUILIBRIUM AND TROPICAL DEVELOPMENT

The ideal picture of a national economy is: (1) sufficient prosperity and full employment, prosperity being defined as a constantly adequate real income per capita; (2) a balanced growth of population and production and (3) a balanced governmental budget ensuring national independence.

To approach the above ideal situation a government as well as a nation must be prepared to make a number of sacrifices. For instance, the non productive and less productive sectors such as government and commerce must not take an unduly large margin of the national income. To supply the growing population with goods and employment necessitates industrial expansion. This, in turn, demands investments which cannot be made without adequate savings. An economic subject can only save if his production output and his earnings with respect to his production cost and his labour exertions all yield satisfactory results. Excessive fiscal pressures, too high prices of consumer goods, too high wages caused through scarcity of labour – all these are factors which influence the savings and hence damage the practicability of an industrial expansion running parallel with the increase in population.

As national production increases, the money supply should rise in conformity with this increase. For the more-developed country the efforts to attain monetary equilibrium should

concentrate on economic development steadily increasing the production of goods, closely followed by a regularization of the money supply.

In principle, the same considerations apply to the under-developed country, although here two distinctions are discernible in comparison with the more-developed country, namely:

Often there is no steady and continuing rise in national production. This means, in fact, that there is a greater danger of monetary forces 'escaping' or 'getting out of hand'.

Often the national economy has not sufficient power and the government apparatus is insufficiently developed to curb the monetary forces.

By the term 'monetary forces' we mean all economic factors which exercise a direct or indirect influence upon the wage and price level in the tropical area concerned. Of these may be mentioned:

1. The expenditure made by the government for the maintenance of a sometimes excessively swollen and inefficient administration. Not infrequently such expenditures amount to 30% of national income.

2. Government revenues derived particularly from indirect taxes, such as customs duties on imports of consumer goods and excises. Generally these taxes form the most important source of public revenues and often greatly exceed the direct taxes on persons and corporations.

3. Governmental expenditure for the improvement of the so-called infrastructure. We refer to road and rail construction, bridge building, utility building, etc.

A symptom of common occurrence in a backward area is

the impossibility of giving out work to contractors other than on a 'cost-plus' basis. The contractor receives a percentage premium over the total cost of the work in question; the higher the expenditure, the higher the premium. There is no incentive to aim at low construction cost. Governments may exercise some control over the materials used for such contracts, but wages can almost always be forced up without hindrance. Should such a wage increase continue for some time, it not infrequently has a snowball effect.

4. Government expenditure made for the purpose of promoting production in certain sectors. For instance, rural credit which often merely encourages consumption. Insofar as a credit for production results in a subsequent consumption increase there is a threat of an equilibrium being disturbed.

5. The extent of high profit margins in the trade sector which may be as high as a quarter of the national income. Commercial operations, specifically the import trade and the distributing trade, form a weak spot in the economic system. There are too many small traders with too little insight into business methods, with the result that there are dislocations in the building-up of stocks, as well as difficulties as to liquidity and credit. The trade in foodstuffs is often characterized by local price agreements and other monopolistic practices.

6. The low average and marginal savings of the large majority of the population. When the income of an individual increases from one year to another with 10 units out of which 2 units are saved, there is a marginal saving of 20%. Income surplus is spent almost immediately on consumer goods which, for the most part, are nonessential.

Because this makes for more imports, it occasions a constant pressure on the balance of payments. Presumably this living 'from one day to another' causes a high velocity of circulation of the money with all its consequences.

7. A devaluation of the monetary unit in order to stimulate exports which may have decreased because of an increase in the cost price. However, this leads to an important increase in the price level of imports which, as has already been indicated, partly consist of nonessential consumer goods.

8. The insufficient utilization of all available production factors, particularly all arable and forestry land. Thus an increase in the money supply, caused by the above factors, cannot be closely followed by an increase in the production of goods, especially when, in the absence of domestic industry, there are no large stocks of goods on hand to act as a buffer.

Without aspiring to any completeness, we have given in the foregoing a number of factors which cause the monetary policy of the under-developed country to differ, in practice from the monetary policy of the more-developed country. The inefficiency of some tropical governments in their economic policies is well known. In those cases there is neither little likelihood of a wise monetary policy being enforced. Nevertheless there are possibilities and we shall try to demonstrate some of them below.

An extremely important factor in economic policy – of which monetary policy forms a part – is the marketing of the commodities produced in order to maintain or improve the standard of living of a rapidly growing population. These commodities should rely for their markets as much as possible on sales within the country itself. However

attractive exports may appear, difficulties in foreign markets may occur – e.g. with price variations, imposition of quotas etc. – which might endanger the continuity of the national production.

The attainment of a sufficient volume of sales in the home country is often hampered by a lack of purchasing power. Furthermore the prices of agrarian products, curiously enough, are often deliberately kept down by the government in favour of the urban population.

Now, a government, in a policy of encouraging harmonious economic development, can fix a price for a few essential foodstuffs such as rice and meat at a level which is at least equivalent to the import prices of analogous goods and substitutes. By means of a subsidy for the benefit of the poorest groups of the population, the government can overcome the drawbacks for poor people of high prices for such products of prime necessity. It can defray the costs of the subsidy by increasing direct taxation on those higher incomes, which often are not taxed very severely.

Thus it would in theory be possible within a short time to inject money into the agrarian sector to stimulate production. That would probably be the best incentive to the farmer to increase his activities. He would be more inclined to act upon the advice of the extension service concerned. He would be able to receive more credit for both production and consumption from his co-operative society. He would be able to intensify the use of his land and his procurement of agricultural machinery, fertilizers, consumer goods, etc. from the town. His prosperity and with it the agrarian income as a whole would increase.

The wide margin in the level of prosperity between town and country, now so usual, would diminish. The possibility

of a taxation on agricultural incomes, and consequently the chance of further government revenues, would increase. Thus a basis could be laid for a real economic expansion which would be entirely out of the question without an adequate agricultural development.

This argument of a fixed and for the farmers attractive price of certain essential foodstuffs is doubtless attractive, but there is a number of objections to it which should be mentioned. We shall specify some of them point by point in the following:

1. In the event of certain essential goods becoming more expensive there is a possibility that the urban population will switch to other local or imported products. If this happens the government will have to take action. This may well be difficult if substitutes are readily available. Suppose, for instance, a government increased beef prices in order to make cattle-breeding remunerative. The consumer might well replace beef by substitutes such as pork, goat meat or dairy produce. Should the government then decide to limit imports of dairy produce by means of high duties, import restrictions, etc., then there might grow a danger of unsatisfactory nutrition. Some of the urban population will no longer buy meat or dairy produce, dangerously reducing their intake of proteins and may buy, say, cinema tickets instead. It is possibilities such as these that make manipulations in the field of food prices extremely risky.

2. A condition for the monetary policy described above was the feasibility of levying taxes on higher incomes. Moreover, it was suggested that, should the need arise, the government should restrict the importation of certain goods. Not infrequently both these measures will be to the

disadvantage of the foreigners residing in the country. For in many tropical areas the import trade is mainly in the hands of foreign concerns. In tropical countries it is generally the foreigners who, as representatives of the foreign financial interests belong to the higher income groups. The government of the tropical country concerned should guard against worsening the financial climate for foreign private investment.

3. If the aforesaid government policy regarding the augmentation of the agrarian income by means of price increases for essential commodities can be effected, a gradual rise in production of the commodities in question may be expected. In view of the fact that the home market, whatever governmental measures are taken, will only absorb goods up to a certain level, a rise in exports may be inevitable. Thus local monetary policy may depend directly on the situation in the world market for the product in question. A monetary policy aimed at an increase in production for a commodity should be preceded by a full investigation of the market.

4. There are still further aspects with which a government must concern itself. As a result of the above-mentioned monetary measures, serious disturbances may arise in the agrarian sector itself. Several decades ago, the penetration of monetary exchange into tropical villages caused many a farmer to develop a predilection for quick growing cash crops. He and his family devoted full attention to this crop which yielded actual short-term monetary revenues. The perennial crops with their relatively costly investments, were thenceforth neglected. Such mistakes whereby, for instance, all attention is concentrated on rice while very good opportunities over a longer period for cocoa and coffee are neglected, may be brought about by our monetary measures.



5. Another aspect which must be taken into account is the sensitive structure of the urban economy in an under-developed country. A price increase in one or more essential foodstuffs will probably have to be followed up by an upward revision of wages for all employees in government service and private enterprises. Otherwise there is a danger that labour troubles will ensue. Furthermore, the granting of subsidies to those groups of the population who have the lowest purchasing power demands close supervision. The relative value to be given to the 'essential commodity' must be carefully assessed. In other words, a payment in cash to the poor will not do, for there is a considerable chance that the money will be spent on luxury goods. For this reason, the 'essential commodity' to be supported must be paid out in kind to the poorest people of the community. That involves administrative expense and trouble.

6. In the above we used the term 'essential commodity'. A number of statistical details is required if more meaning is to be given to this term. It is important, for one thing, to make periodical researches into family budgets for the various income groups; and for another, to keep historical records regarding local market prices for the commodity in question. Particularly the question to what extent consumption will react to the price increase is of importance. It is practically certain that a 10% price increase will bring about a drop in consumption per consumer. The point that matters for a successful monetary policy is that this drop in consumption should not tally exactly with the price increase. In other words, the consumption per capita should not also drop by 10%, the price elasticity of the demand for such a good might be low. The drop should be 3%. Here the share played by the consumption of the commodity in the

total family budget is important. Tropical countries are not like more-developed countries where a relatively small part of the family budget, from 15 to 20% for instance, is always spent on essential foodstuffs such as bread and potatoes. In Asiatic countries the consumption of rice, for example, may well comprise from 30 to 40% of the total family budget even for a relatively well-off family.

The Government seldom has adequate statistical data at its disposal to recognize in advance the extent of the problem referred to. It will be clear from the difficulties listed above that a seemingly simple monetary measure, aimed at accelerating economic development, can have a great many consequences.

We have discussed one of the many intricate problems of monetary policy. We shall mention another one, be it with a few words. To fight unemployment, authorities execute public works such as road construction, soil conservation, etc. Sometimes the workers are paid partly in cash, partly in kind, like e.g. wheat. This wheat can either be produced in the country itself or be a gift from a foreign organization.

The fact that wages are partly paid in money makes workers sometimes money-minded. Many of them feel unhappy with a payment in kind. They try to sell the wheat, which evokes a price, inferior to the regular market-price of wheat.

Such events show that the use of money has deeply penetrated into tropical countries which makes a sound monetary policy ever so more important.

## *Chapter XII*

### MEASURES FOR THE IMPROVEMENT OF RURAL CONDITIONS

Fifty years ago one could only read – and only in a few books – about economic planning. Those books often dealt with socialism and marxism. The Russian revolution of 1917 brought a theoretical conception into practice and the conception proved to be feasible from an economic point of view. Since 1940–1950 a tropical country feels somehow uneasy without a long term overall plan. Planning for such a country, however, has little to do with socialism and marxism. It has more to do with the viewpoint, common to most tropical countries, that development in the colonial period took place in a more or less haphazard way, that this development was mainly for the benefit of the overseas European countries and that such a state of affairs cannot be tolerated any longer as soon as a country has become independent.

One should distinguish sharply between the formulation and the execution of a long term plan. It is the execution which makes a plan definitely communistic. As soon as this execution is placed in the hands of a central authority which takes all responsibility and which can eliminate by force any resistance from whatsoever origin, one has a communistic plan. But there is hardly any tropical country where such a situation occurs. We shall discuss planning not in the sphere of communism but in the sphere of a young tropical country.

The formulation of a general development plan for such a country which includes not only agriculture but many other production sectors, could be done in the following way:

First of all an analysis of the present economic situation should be made. Normally this is done by making national accounts, indicating national production, national income and national consumption, if possible over a couple of years. To these national accounts which should give the outcome of each main production sector, should be added an analysis of the balance of payments.

The next step will be an inventory of the production potentialities for the future. The situation for each production factor – land, manpower, capital, energy, management and organization – should be known.

Now a number of directly productive (industry) and indirectly productive (vocational training) projects should be formulated. For each project and for each year the amount of money and of manpower which shall be needed, should be known as well as the contribution to production and exports, once the project is finished. The latter magnitudes are often calculated in constant prices.

At this level there is need for an overall check to be sure that the total amount of money, of raw materials, of managers etc. will be available. It is also about time to establish priorities for certain projects. A project might deserve priority for several reasons, e.g. as there are relatively little technical risks, as there is a quick and considerable contribution either to production, to consumption, to exports or to all of these three.

Generally preference is given to projects which have a high capital/output coefficient. An investment of 6 units of capital

might provoke an increase of 2 units of income for an industrial project and only of 1 unit for an agricultural project. The time needed for a unit of national income to grow might be 1, 5 or 10 years or more.

It is now possible to make a projection of national income and balance of payments into the future, either 5, 10 or 20 years ahead. The result should be an equation, which in a simplified form could indicate the situation at the end of the planning period in the following way:

TABLE 16. Confrontation of means and expenditure

	No plan	Plan	Change		No plan	Plan	Change
Net production	ooo	ooo	ooo	Consumption	ooo	ooo	ooo
Indirect taxes	ooo	ooo	ooo	Private			
Foreign loans	ooo	ooo	ooo	investment	ooo	ooo	ooo
				Government			
				expenditure	ooo	ooo	ooo
Total of				Total of			
means	ooo	ooo	ooo	expenditure	ooo	ooo	ooo

The figures under the heading: No plan should demonstrate where the national economy would be in the next 5, 10 or 20 years without a plan.

Finally the whole long term plan should be broken down in annual parts and a careful check should be made in order to be sure that for each year, for each sector and for each project man power and money are available. If possible a forecast should be made about the situation after the plan, in particular as far as savings and investment are concerned. If one of the objectives of the plan is to obtain a status of financial independency for the country, it is of utmost importance to estimate the amount of domestic savings,



both public and private which will be available for a continued process of economic growth. Another factor is the manpower which will come available after the planning period, especially when big projects in the sectors transport and construction will be finished. There is a risk of unexpected unemployment.

Normally the main objective for overall planning is a maximum increase of national income and an equilibrium in the balance of payments. However, one might introduce supplementary objectives such as the objective of a high nutritional standard for the population or the objective of full employment. It is the author's opinion, however, that the main objective of a young tropical country, which has recently obtained its political independence, should be a maximization of national income including a sound balance of payments. Only in this way such a country can become independent from an economic point of view. These objectives do not exclude the need for better nutrition and for more employment. There is an urgent need for more production and more investment. It is in fact the rate of growth of investment which decides on the outcome of an overall plan.

One finds often that the implementation and execution of a plan in a tropical country has been placed in the hands of a specialised agency, called development board which has mostly an independent financial status and which acts over the heads of the technical departments.

In order to know in how far the execution of the plan was a success, the population increase during the planning period must be taken into account. Suppose that at the

beginning of this period national income is 1 million dollars and the number of inhabitants 10,000. Per capita income is 100 dollar. Suppose that the execution of the plan leads to an increase of national income of 50% in 10 years which represents a rapid economic growth. National income has increased to 1,5 million dollars. Suppose that the population increases with 2% a year, a normal figure in many tropical and subtropical areas. The number of inhabitants at the end of the planning period is 12,000. Per capita income is 125 dollars. In 10 years per capita income has gone up with an average of 2,5% per year. But this figure is an average which does not reveal how much progress in the lower and lowest income groups has been achieved.

One of the great problems in planning for under-developed countries concerns the desirable degree of industrialization of the country. After the Second World War many countries saw industrialization as the best and quickest remedy against economic backwardness. Gradually they grew aware of the fact that industry does not solve all the problems and that it always asks for heavy investment, highly skilled labour and much know-how. There is a feeling that agriculture will stay the most important sector of development planning in many tropical countries for the next few decades. This involves the need for a relatively high allocation of funds to this sector. One finds percentages going from 15 to 50%. The repartition of available funds might be like this: Agriculture 25%, Transport and Energy 20%, Construction 10%, Industry 20%, Administration 10%, Health, Education and Social Welfare 15%.

The economic problem of tropical under-developed areas is basically that of poverty. This poverty is due in part to the

weakness of the agricultural sector, which manifests itself in a low production per acre or hectare and per agricultural worker. The table below shows the percentage of the agrarian population to the total population and the productivity per hectare and per worker. It is remarkable, in this connection, that in a decade there has been scarcely any increase in production in tropical regions.<sup>1</sup>

TABLE 17. World agricultural production 1938-1948

Country	Agr. pop. as % of total population	Yield per ha. 1947-1948 as % of 1938	Yield per worker 1947-1948 as % of 1938
North America . . . . .	20	140	143
Central America . . . . .	67	140	143
South America . . . . .	60	109	83
Europe . . . . .	33	89	85
Australia . . . . .	33	113	123
Asia . . . . .	70	95	92
Africa . . . . .	74	95	100
World average . . . . .	59	105	100

The weakness of the agricultural sector in the under-developed countries is due to several causes.<sup>2</sup> These include, inter alia: the poverty of the soil whether or not caused by improper use — an unfavourable climate, defective tools and appliances, erroneous methods of production and marketing and the unstability of markets caused by the elasticity of demand and the fluctuation of world market prices of the various products. This state of affairs has a number of economic and juridical aspects which are broadly identical for every country.

<sup>1</sup> See a.o., *Landreform: Defects in Agrarian Structure as obstacles to economic development*, a United Nations publication, New York, 1951, page 6.

<sup>2</sup> See e.g., *Soil Conservation*, a F.A.O. publication, Rome 1952, page 13.



As such may be mentioned the differences between large estate holdings and small agricultural holdings, that is to say between plantation agriculture and domestic agriculture, the various systems of landownership, the methods of transfer of property, the ground rent system, irrigation methods, credit and the organization of marketing.

Land in the tropics is mainly employed for the production of various crops. Other uses of land have not always been properly exploited in under-developed tropical countries. For that reason in studying the potentialities for future development more attention should be paid to the development of areas for cattle-breeding, in order to diversify the agrarian structure. The development of pasture is closely linked with the future of small domestic farming. The lack of pasture land hampers the creation of mixed farming – which is less susceptible to economic set-backs because of its many-sidedness. Cattle raising is also of importance because it allows organic manuring. Forestry is another sector which deserves much attention.

Two other possibilities of land use may be mentioned, viz., land for towns and land for market gardening. In general, this aspect has been neglected in most tropical countries, partly because of a lack of good horticultural soil. This question gains in importance as the town which serves as the consumption centre of the horticultural region expands. The land enhances in value because of the increased demand of land for building and for horticulture.

All available information shows that many tropical countries are actively working to improve the existing situation in agriculture. This is because such countries, as stated above, have a predominatingly agrarian structure, a structure which

embraces the great majority of the total working population. It should again be mentioned, however, that the average size of a holding is not more than one or two ha. ( $2\frac{1}{2}$  to 5 acres) and that the yield per unit of area is often still relatively low. The reasons for this minimal production have been examined in other chapters. The climate, and its vagaries, proved to be an important factor. The fact that farms are generally small has important social-economic consequences. In order to get a clear view on a local situation it is important to know whether productive resources – such as soil-fertility – become exhausted, whether productive potentialities – such as good arable land – remain unutilized, and whether production year by year is adequate to supply the physical needs of the individual and the community as a whole.<sup>1</sup>

The latter will only prove possible if the increase of the population is matched by a corresponding expansion of agrarian production. As to domestic or family agriculture, a failure of production will force the producer to try to attain a minimum income by working elsewhere, e.g. in estate agriculture, in the cottage industry, in the administration, in industry, in forestry etc.

The minimal size of farms and the low agrarian income per family hamper the creation of a domestic agriculture which is economically independent. Such economic independence is desirable because it would generate and stimulate general economic development – a development largely dependent on a prosperous domestic agriculture.

From the economic point of view domestic agriculture is characterized, as has been said before, by under-capitaliza-

<sup>1</sup> See *State of Food and Agriculture: Review and Outlook*, a periodical publication of the F.A.O.

tion, by exhaustion of productive resources, and by a lack of efficiency. All these factors lead to a relatively high cost price. In view of the defective marketing methods, this relatively high cost price is sometimes not covered by the sales price. The afore-mentioned juridical aspects, specifically those relating to landtenure will considerably aggravate the economic problems of the small farmer. The purchase of land by the small farmer may prove difficult due to the existing legislation.

The measures proposed in various development schemes generally aim at removing the above-mentioned shortcomings. Attempts are being made to increase production by technical improvements of areas, by increasing production per acre and by bringing unoccupied land into use.

Efforts are being made to raise the production per acre by means of a number of technical measures, such as the introduction of better seeds, of mixed farming and of a sound crop rotation system. Constant efforts are being made for a greater mechanization of domestic agriculture. To what extent mechanization will prove technically possible for domestic farming will only be apparent when a few decades have passed. For the time being, probably more benefit is to be expected for the small farmer from the rapid development of agricultural chemistry. Accordingly, problems regarding the combatting of weeds, organic manuring, etc. are being studied in many under-developed countries.

With respect to the size of farms attempts are made to enlarge them by means of reclamation, irrigation, drainage and poldering, and also by the redistribution of land. In this connection, problems relating to the water supply of the area in question should be considered of great importance.

In fact, in many tropical countries and especially in sub-tropical countries the water supply has always been the most important factor.

Thus the attention which is devoted to technical projects designed to bring about an improvement in water supplies, is wholly understandable. As such may be mentioned the so-called multi-purpose development projects. As an example: in improving a river or lake system, a many-sided project may be developed which, in addition to collecting water for irrigation purposes and for the generation of electric power, may also improve the water transport facilities.<sup>1</sup>

Rural development schemes which aim to solve the complex problems of domestic agriculture by means of a many-sided development have social as well as economic effects.<sup>2</sup> Measures in the economic, agricultural, juridical and social fields which are carried out within the frame work of such a rural development scheme, are designed to bring about, within a presented region, a size of holding adequate for an independent existence, a gradually increasing farmer's income, and generally a better life for the rural community. A certain area, for instance a district or some other geographic or agrarian region, is taken as a unit for such regional development. In such regional development planning, the necessary basic data are first collected regarding the area concerned. This survey – the complete assessment of the existing potentialities – is of prime importance in planning for proper development.

<sup>1</sup> See for example literature regarding the Gezira project in Africa and the Damodar Valley Corporation in India, viz. *The Gezira Scheme from within*, Sudan Gezira Board, 1954.

<sup>2</sup> See a.o. *Essentials of rural welfare*, New York 1949; *Problems of rural community development*, published by Ruopp, The Hague, 1953.

This regional planning is of great importance in the development of tropical under-developed areas. It aims at a balanced regional growth, it includes development projects in agriculture industry, transport, etc. In the agrarian sector of such a regional development scheme the prime objectives will as a matter of fact be an extension of the cultivable area and an increase of production. But significance should also be attached to the improvement of marketing possibilities.

Direct or indirect intervention by the authorities is sometimes recommended in the pricing of agricultural products. In some cases this is done by fixing retail prices or by giving subsidies to the consumer. Also attention is paid to the profit margins of middlemen – those who collect and distribute the product. Governments may take steps to guarantee minimum prices to farmers, for instance by establishing central purchasing agencies.

In addition to improving transport facilities and enlarging storage and cold-storage space, efforts are made to improve rural conditions by encouraging co-operative farming and by extension of a sound rural credit system. Defects in land-tenure are often adjusted by modernizing existing legislation, to the advantage of family agriculture and to the disadvantage of large estates. In this way subdivision, redistribution, dispossession or seizure of land may occur. Usually individual ownership is encouraged and communal ownership abolished. The feudal relations with respect to water rights and usufruct also often ask for intervention in the legislative sphere.

The urge towards economic independence implies a striving towards a better balance of payments and hence towards increasing exports and restricting imports. But

planning in under-developed countries often faces the dilemma that on the one hand the advancement of small agriculture must prevail in view of the social benefits of this form of production, and on the other hand that estate agriculture is more likely to increase production of staple products for export. A clash of interests is then liable to occur, the outcome of which will depend on the particular political circumstances existing.

Thus the carrying out of a development plan envisages a wide and comprehensive policy comprising directly productive and indirectly productive projects. As far as priority is concerned those projects demanding the lowest governmental expenditure and the least supervision are preferably dealt with first. In this manner the administration is able to get results within a short time, without excessive pressure being placed upon it. Special attention must be devoted to measures of a monetary and fiscal nature. As to monetary policy, we pointed out that it is sometimes feasible to raise the domestic price level of agricultural products by means of subsidies, etc. This makes the control of the urban wage levels inevitable, but it might offer a good opportunity to augment agricultural incomes quickly and without extensive governmental interference. Other measures, such as the stabilization or reduction of the government's ordinary expenditure, regulation of imports and subsidizing of exports may also be found desirable.

Saving campaigns and various measures in the field of home economics are of indirect productive value. Employment can be promoted by fiscal measures: for example, certain tax exemptions may be given for certain rural areas to discourage migration to urban areas. The economic conditions of trade

in agricultural products can be rectified by the elimination of the marginal enterprises by means of fiscal measures.

Also as a part of the afore-mentioned policy, it will be necessary to introduce a number of measures which are indirectly productive and yield results at a rather slow pace. These measures, which must form a basis for any real development scheme, are directed primarily at a strengthening of the human factor. They include measures influencing production and measures influencing consumption. For the agrarian sector this implies, among other things, the promotion of elementary and technical education, both for children and adults. Thereafter come extension, agricultural research work and rural credit schemes. Efforts to ensure a better and more efficient expenditure of income which fall primarily in the consumption sphere are at the same time of utmost importance in promoting savings by housewives and thus by a whole nation.

All these types of government activities are essential but most of them yield results only after a considerable time.

The following table shows that progress is very slow if one takes an increase in population since 1939 of at least 30% into account:

TABLE 18. Indexnumbers of agricultural production<sup>1</sup> (prewar = 100)

Country	1953/54	1954/55	1955/56	1956/57
Chile . . . . .	133	136	137	136
Colombia . . . . .	177	176	186	183
Cuba . . . . .	145	141	146	159
Burma . . . . .	88	89	90	97
India . . . . .	118	118	120	122
Pakistan . . . . .	108	112	109	115
Thailand . . . . .	177	153	179	192
Egypt . . . . .	120	131	133	136

<sup>1</sup> See F.A.O. *Monthly Bulletin of Agricultural Economics and Statistics*, April 1958.

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